PART II

FORT ANCIENT

THE GREAT PREHISTORIC EARTHWORK

OF WARREN COUNTY, OHIO

BY

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ILLUSTRATIONS

CHAPTER I

THE HISTORIC PERIOD AT FORT ANCIENT.

In preface to a detailed description of the various embankments, mounds and camp sites, it is well to place on record how Fort Ancient came to be preserved as a park by the State of Ohio. For although most persons are aware that the State has come into possession of several remarkable earthworks of pre-Columbian times, the facts leading up to such worthy action, may not be generally known.

Those of us who lived near the place had heard more or less concerning it. Mr. North of Old Town—the site of Old Chillicothe, three miles north of Xenia, in Greene County—used to relate to interested boys stories of adventure with Indians handed down from his father, who had heard them from the lips of Simon Kenton, the friend of Daniel Boone. One of these mentioned that Kenton—who spoke Shawano well—said the Indians had no tradition of the builders of Fort Ancient, but that they (the Shawanoes) visited the place en route to the Ohio and did homage to the spirits of its makers.

Xenia is twenty-two miles north of Fort Ancient, and in the early eighties, after the publication of Professor Short's "North Americans of Antiquity", there was much interest manifested in the earthworks of the Little Miami Valley. Picnic parties to Fort Ancient were organized every summer and as a boy in company with older persons, I occasionally visited "the Fort". In those days, as at present, Fort Ancient was a favorite resort for such excursionists. Apropos of this it is proper to state that in the early summer of 1891, 800 persons visited Fort Ancient in one day. This was the occasion of the opening of some thirty stone graves, and citizens from Cincinnati, Columbus, Dayton and other distant points were present. Local interest in Fort Ancient exceeded that of the Serpent Mound, which was more difficult of access. The place had a fascination for me and I spent many happy days thereabouts collecting specimens.

In the summer of 1887 Mr. Clinton Cowen, C. E. spent a week with me at Fort Ancient. We dug in the village site along the banks of the Little Miami river. The next winter (January 8, 1888) I wrote an article for the Ohio State Journal, urging the preservation of Fort Ancient. This article was copied extensively throughout the state, aroused considerable interest, and numerous persons wrote me. Mr. A. A. Graham, at that time Secretary of the Ohio State Archaeological and Historical Society, asked me to call upon him at Columbus and the next spring he and I visited Fort Ancient.

Late in February, 1889, Mr. Gerard Fowke and myself met in the State House at Columbus where we agreed upon the survey and exploration of Fort Ancient. Mr. Alfred Cowden, the principal owner of Fort Ancient at that time living at Morrow, and Mr. and Mrs. Dunham and others of Lebanon, heirs in the Fort Ancient estate, were visited by us. Mr. Cowden and the other owners were quite willing to cooperate with the proposed survey and gave us unlimited leave to excavate, survey, map and photograph. All specimens found were to be my property as the survey and exploration were in the interest of no institution.

June 8th arrangements were made with Mr. Robert Clarke, head of The Robert Clarke Company, Publishers at Cincinnati, to issue the book "Fort Ancient" as soon as the explorations were completed. This firm was founded in 1858, succeeding the house of H. W. Derby & Co. The Derby Company was one of the earliest publishing houses in the West. It and the Robert Clarke Company made a specialty of history, science, biography, archaeology, etc. Mr. Clarke's private collection of first editions on America, and library of early American history, now in the University of Cincinnati, is one of the finest extant. Mr. Clarke was more than a publisher; he knew much concerning archaeological matters and was an authority on Ohio Valley bibliography. He died in 1899.

He impressed on me the necessity of a thorough exploration—that Fort Ancient was now a jungle and that we would be compelled to expend a large sum of money in

PLATE III.

Rear View of Portion of East Wall of New Fort. Camera outside of Fort, 100 yards distant, looking [illegible].

PLATE IV.

Part of Wall of New Fort. Camera outside of East Wall, n earest, and looking South. 1000 feet of embankment shown.

order to examine the place carefully and systematically; that we must make huudreds of accurate measurements, for other men might attempt to upset our calculations—a prediction afterward verified. To Mr. Clarke we were indebted for many wise counsels and practical suggestions.

The force employed varied from seven to fourteen persons. Besides Messrs. Fowke and Cowen, Mr. W. W. Ralston acted as stenographer, and Mr. Strong of the Cincinnati Camera Club was photographer. Some of my workmen had dug for me during brief field work in '87 and '88. Three of them went on the Hopewell survey. These men had become quite skilful and could remove skeletons which at first glance seemed too frail to be handled. Decayed skeletons they worked about with hand trowels and whisk brooms, brought the bones into relief by cutting away the earth underneath, whitened the bones so that there might be sufficient contrast between the skeletons and the clay. In some photographs of field work the bones do not show distinctly, because the skeletons are of the same color as the clay. This can be avoided by careful work and whitening the bones as stated above.

The collection made in 1889 was placed in the Smithsonian Institution where my collection had been exhibited for some time. In '91 and '92, a part of my collection was bought by the Smithsonian Institution, but the greater part of it—including the Fort Ancient material—was exhibited in Orton Hall, Ohio State University, when I was appointed curator of that museum March, 1894. Part of the Fort Ancient collection was bought by Mr. F. W. Parker of Omaha, but the major portion of it went to Columbus as stated above.

Early in 1891, Prof. F. W. Putnam, Chief of the Anthropology, World's Columbian Exposition (Chicago), sent for me to visit him at Cambridge. At that time Dr. George A. Dorsey, post-graduate student in Harvard and an old college friend of mine, was appointed to carry on explorations in South America for the Exposition. He and I were in consultation together with Prof. Putnam during some days. The Professor appointed me an assistant to explore

various remains in Ohio. He wished to make a relief map of Fort Ancient such as had been made of the Serpent Mound from Mr. Cowen's survey of that structure in 1890. I told Professor Putnam that additional cross sections, various levels and measurements were necessary in order to furnish sufficient data, but that a re-survey of the walls of Fort Ancient was a needless expense. However, Professor Putnam wished the place re-surveyed and accordingly it was done. Mr. George Little, a graduate surveyor, and Mr. John Munger, assistant, chain and axe men were employed and the whole work re-surveyed in the early summer of '91. Three months were consumed in making an exhaustive re-survey. The total length of the walls was given by Cowen and Fowke as 18,712.2 feet. Little and Munger surveyed from points independent of those established by Fowke and Cowen and the total variation was less than ten inches. This is remarkable when one considers the irregular walls and the difference of opinion which must naturally arise as to where the gateways end or begin. The second survey emphasizes the accuracy of both surveys and that a subsequent survey of Fort Ancient would be an inexcusable waste of time and money.

For several years it has been my desire to bring within one volume the complete surveys of 1889 and 1891, together with all that has been observed by other investigators at this interesting and remarkable place. Such a publication would permit me to somewhat modify conclusions or observations made in '89, '90, '92 and '95. Again, certain statements or deductions may be put forth more strongly and better substantiated than in the original publication.

In this Bulletin I have made use of about a fourth of the original plates of the book "Fort Ancient". In many of these the lauguage has been changed, others where measurements are given and the text relates to observations as to walls, moats, terraces, etc., are presented as they were published in the original book. I am quite aware that the chapters devoted to the embankments themselves, and kindred subjects, make very dull and tedious reading, but in

order to understand the place thoroughly and just what it means, he who is interested in archaeology should follow the text carefully. General readers will be interested only in the conclusions and final observations.

Mr. Webster Williams of Fort Ancient, took eleven of the photographs during the winter of 1905, when conditions were perfect. The specimens are from the Andover collection (found by Mr. Clifford Anderson) and from my own collection now owned by the Ohio State University.

I am indebted to Mr. W. C. Tichenor of Dayton, Ohio, for permission to reproduce from his "Guide to Fort Ancient" the view of the Valley (Plate XXI) and Plates VIII and IX; also to Professor W. C. Mills for suggestions. Those who cooperated with the surveys of '89 and '91 have been thanked in previous publications.

Comments on the survey for Professor Putnam are unnecessary but I have reprinted the record of the exploration of village sites flanking the Little Miami river. This work was done for Professor Putnam and all the specimens found, together with numerous skeletons, were shipped to Chicago. It has been thought best to reprint some portions of explorations along the East Fork of the Little Miami and of Clinton County. These places present Fort Ancient culture and are very interesting on that account.

THE PURCHASE OF FORT ANCIENT

Although it is not the writer's purpose to present all the details concerning the purchase of Fort Ancient by the State of Ohio, the essential facts are herewith given.

During the course of the 1889 explorations, hundreds of people visited the Fort. The Cincinnati papers sent representatives and numerous interviews were published. The next winter, the Hon. Jesse N. Oren of Wilmington, and representing his district in the Ohio State Senate, introduced a bill to purchase the fortification. This bill passed April 28th, 1890. Through an oversight only half of the enclosure was purchased and Senator Oren introduced a second bill, which passed the Senate but was omitted in the

Report of the House Committee. April 16th, 1906, the legislature passed a bill authorizing the purchase of the remainder of Fort Ancient.

The following extracts from a letter written by him April 10th, 1908, to the author of this Bulletin are self-explanatory: —

* * * * "I remember you very well. I visited Fort Ancient while you were making the survey. Later, you gave me a copy of your book.

"I was elected to the Senate in 1889. After my election, the importance of preserving Fort Ancient was first called to my attention by Prof. Jonathan B. Wright of Wilmington College, who said: 'The State ought to own Fort Ancient'. I had never given the subject much thought, but after reading your book I was more and more impressed with the importance of preserving these prehistoric works.

"With a view of carrying out the idea, I introduced a bill and succeeded in having it passed, providing for the purchase by the State, of the grounds upon which the most important part of the Fort is built; putting the Fort under the control of the Archaeological and Historical Society of the State.

"The importance of Fort Ancient as a prehistoric work was never fully realized until the publication of your book in 1889. You have rendered an invaluable service to the science of archaeology in what you have contributed to the preservation of this wonderful work.

I am, very respectfully yours,

"Jesse N. Oren."

In answer to a letter of inquiry, a communication was received from Professor J. B. Wright, dated April 21st, 1908. Professor Wright states that he took a party of friends to Fort Ancient in the fall of 1889. During the course of dinner, Mrs. Wright suggested that her husband speak to Senator Oren about the preservation of Fort Ancient. Thus it will appear that whether these persons were influenced by the 1889 survey or not, much of the credit for the purchase by the State of Ohio, is due to them.

Immediately after the first purchase, the State set about

PLATE V.

View from inside of New Fort; camera looking East. Summer view of same walls shown in Pl. IV

PLATE VI.
Within the New Fort, west side. Walls on the edge of hill overlooking the River.

improving Fort Ancient. The care of the work was given to the Ohio State Archaeological and Historical Society, and Mr. Warren Cowen was appointed custodian. He has held that office for fourteen years and improved the property greatly. The small, low mounds of 60 to 70 feet diameter have been restored slightly, by Mr. Cowen. The edges, constituting natural wash, have been thrown up and the mounds thus changed to 30 feet diameter and 6 feet height — the same kind of work was done by Professor Putnam at the Serpent Mound. Mr. Cowen resides on the spot in the original farm house, which has been remodeled for his benefit. A committee appointed by the Society has supervised the work of this custodian. Retaining walls have been constructed where washes occurred, underbrush has been cleared, some of the moats have been drained, and a pavillion for the accommodation of visitors was erected. The walls have been sowed with blue-grass. Altogether the Society has done an excellent work at Fort Ancient and is deserving of credit. Fortunately no "restorations" have been attempted, and the walls remain in their original condition.

At the time of the first purchase, Col. Van Horne, a gentleman interested in landscape gardening and to some extent in archaeology, visited Fort Ancient with a view to beautifying the place. While it is far from the writer's purpose to speak disparagingly of Col. Van Horne, if the truth is to be told, lovers of Fort Ancient will rejoice that the Colonel's plan of "landscape gardening" was not carried out. He did some grading on the edge of the ravine in the center of the North Fort (see point marked "house and barn" upon the map, Plate II). He informed me that this grading was a preliminary in the construction of a macadamized road entirely around Fort Ancient. The appropriation was not sufficient to complete his scheme, and the rains soon washed out the Colonel's road.

A bad gulley began to form back of the house, and had not brush been filled in, the break might have become serious. But, fortunately, no permanent damage resulted.

Col. Van Horne made no regular survey of Fort Ancient. His equipment consisted of a hand level and steel tape.

His researches were conducted alone and no force accompanied him. It is necessary to remark these facts, for he was requested to make a map of Fort Ancient to be hung in the State House, and an artist under his direction copied the map drawn by Messrs. Fowke and Cowen on an enlarged scale and for years it hung in the State House at Columbus. As no credit was given those of us who made the survey, I have always felt that Col. Van Horne did the survey of 1889 an injustice.

BOOKS ON FORT ANCIENT

On page 164 will be found a bibliography of Fort Ancient literature.

The first printed account of Fort Ancient that we have record of, is in the "Portfolio", published in Philadelphia, in the year 1809. It was described and a plan given in the "Pioneer", of Philadelphia, also in the year 1809. It was described and figured in Drake's "Pictures of Cincinnati", in 1815. Caleb Atwater, in 1820, in the "Transactions of the American Antiquarian Society," presents an intelligent account of the place and gives us a map. This was afterwards copied by Howe in his "History of Ohio". Atwater's description is quaint. Although he wrote before 1820, his remarks are more sensible than those of some recent authors. According to his description the walls have changed little since his day — an indication of their age.

Squier and Davis gave the best description of Fort Ancient that we have had previous to 1889. Locke's survey, copied by them, is fairly accurate.

Among recent publications upon Fort Ancient there is "A Guide to Fort Ancient", by Mr. W. C. Tichenor of Dayton, O. This is a neat pamphlet of 34 pages with nine illustrations. It is well written, accurate, and contains all needed information. It is the Fort Ancient "Baedeker", and we commend its perusal to visitors who would understand what they observe.

A more pretentious work, published this year, is "The Masterpieces of the Ohio Mound-builders", by the Hon. E.

PLATE VII.
Top of the Embankment near Station 12, looking North.

O. Randall. Mr. Randall is secretary of the State Archaeological and Historical Society. In his book of 126 pages he gives numerous figures and interesting descriptions of the chief hill-top fortifications of the state. 76 pages are devoted to Fort Ancient. His narrative is popular rather than scientific, and his style quite entertaining. He quotes at length from the various surveys and descriptions of Fort Ancient, and thanks to his judicial training is able to examine and comment upon discrepancies in the observations of the archaeologists who have written about the Fort.

Both of these books present the "new Fort Ancient" — the attractive park instead of the former brush-covered plateau. Mr. Randall, during his many years as Secretary, has contributed more than anyone else to the bringing of Fort Ancient to its present state of beauty.

Dr. Cyrus Thomas published a brief account of Fort Ancient in the "Handbook of American Indians", issued by the Smithsonian Institution, 1907, page 469. The description exhibits a lack of familiarity with the place. Dr. Thomas has always underestimated the amount of labor expended by the builders of Fort Ancient.

When the survey of 1889 began work, it was clear to us that there had been no uniformity of terms in the many descriptions of Fort Ancient. Farmers residing near "the Fort" had always recognized two divisions, the New Fort and the Old Fort. These terms were entered upon our map, together with additional names.

New Fort.—The northern Fort; that portion of Fort Ancient lying north of the Crescent Gateway, or north of the Isthmus.

Old Fort.—The southern Fort; that portion of Fort Ancient south of the Great Gateway; the irregular part lying south of the Isthmus on the map.

Great Gateway.—The dividing mounds at the south end of the Isthmus, which are marked stations 103 and 285, and which separate the structure into the Old and New Forts. These stations are on their highest points.

Isthmus.—The narrow neck which divides the structure almost into halves.

Crescent Gateway.—The wing walls which run out from stations 306 and 89.

The space between these and the Great Gateway is known as the *Middle Fort.*

A few names have since been added by the State, but the important places still bear the original nomenclature.

PLATE VIII.
Approach to Fort Ancient from the West. (From the Railway.)

PLATE IX.
The Great Gateway; looking South. A Recent View.

CHAPTER II.

GENERAL DESCRIPTION OF THE FORTIFICATION AND THE SURROUNDING COUNTRY.

On a slightly rolling plateau in Warren County, Ohio, overlooking the beautiful valley of the Little Miami river, is situated Fort Ancient, the greatest of all prehistoric earthworks in the Mississippi basin.

This plateau is remarkable in its configuration. There is nothing precisely like it to be found in the Ohio valley, so far as the writer's observation extends. The plateau is cut up irregularly by ravines, and although none are of great length, yet all of them are precipitous and attain their depth within a few hundred yards from the beginning of their erosion. The fortification on one side (the west) follows the edge of this plateau and at most points on that side overlooks the river valley. The walls farthest away from the river are the straightest and also the strongest. Particularly is the strength observable at the eastern extremity, station 1 to 10 on the map (Plate II). The plateau near station 1 is 19 feet higher than the western portion, as will be observed if the reader consults Plate II and examines the two cross sections, one surveyed through the southern portion of Fort Ancient, and the other across the northern extension.

The valley opposite the New, or North Fort, is fully half a mile in width. Above and below the extent of the enclosure this valley narrows abruptly, and at one point—opposite the centre of the Old Fort—the hills come down to the water's edge on either side. The soil is quite fertile and excellent crops are raised yearly by resident farmers.

The Pittsburg, Cincinnati and St. Louis railroad (the Columbus and Cincinnati division) passes through the valley on the east side, following the curves of the river, and swinging around the South, or Old Fort. The Lebanon and Chillicothe turnpike passes through the New Fort at a point near its northern extremity. The station in the valley

is named in honor of the earthwork, Fort Ancient, as is also the post-office.

The height of the plateau above low-water stage is 269 feet. The height of station 1 in the survey above low-water stage is 291 feet.

The height of the embankment at station 1 above the Atlantic ocean level is 941 feet. Although the distance around the inclosure (following the center of the embankment) is 18,712.2 feet, the structure is so irregular and crooked that a straight line drawn from station 389, in the northern portion of the fortification, to station 187, in the southern part of the earthwork shows a distance of but 4,993 feet, or less than one mile.

One leaves the railroad station and walks east, ascending the hill over the long and winding turnpike.

Near the summit, this road swings in a graceful curve to the north and then to the south, completing two-thirds of a circle. The view up and down the valley from the summit just before the pike passes through the embankment, is picturesque and commanding.

Although Squier and Davis in their survey of Fort Ancient drew the turnpike as curving toward the south and then north, old residents inform us that it occupies the same lines assigned it by the county surveyors who projected it.

Turning one's back on the view of the valley and proceeding eastward, one observes towering high above the roadway and extending in unbroken line to the right and to the left, a heavy mass of foliage. This is the first or western wall of the enclosure and the turnpike builders cut through it. The banks of the cut are quite steep and afford observers an opportunity to study the character of the walls, how it was built, and the percentage of loam, clay, gravel and stone contained in it. All walls of Fort Ancient, save at the east, before the purchase by the State of Ohio, were covered with a dense mass of underbrush, bushes, vines and saplings. The innumerable roots of this vegetation prevented washes from occurring and were a safeguard for preservation. In fact, the few gaps in the walls of Fort Ancient are due to the disturbing hand of

the white man rather than to the elements. The State has since built retaining walls and prevented further erosion.

In the centre of the embankment on the left side of the cut, is a layer of flat limestone slabs extending horizontally for a distance of ten feet. These stones lie as if they had formed a rude wall, and although at present but three or four—or possibly five —stones are observed lying one above the other, yet it is not unreasonable to suppose originally they formed a wall of some height. Judging from outward appearance, the stones are worn, but that may be due to atmospheric conditions before the stones were placed in the wall. Limestone disintegrates rapidly when left in the open, as well as in running water. The roots of a small tree have held the stones in place. These slabs range in weight from ten to sixteen pounds and are about six feet from the base of the embankment and lie to the left of the center.

Plate VIII, page 46, illustrates the entrance of the turnpike into the New Fort at this point.

After one has passed through this cut in the embankment, one finds himself on the great plain enclosed in the area of the New or North Fort. The embankments on the east side are the most imposing, and the highest of any found throughout the structure. Attention is called to Plates I, III, IV, and V which present views of this stretch of embankment. It will be observed that some of the photographs have been taken in winter and others in summer.

Few visitors to Fort Ancient approach it from the east. The majority of those who spend a day—or even a few hours—in an inspection of this wonderful place arrive by train from Cincinnati or Columbus, or drive over from Lebanon. While the view which suddenly breaks upon one's sight after entering the enclosed plain through the cut in the turnpike is interesting and to some extent beautiful, yet a much more impressive and comprehensive picture of Fort Ancient is obtained if one will approach from the the east or southeast. There is a little valley about a mile east, or southeast of Fort Ancient. Until one's carriage ascends the opposite slope, there is nothing to indicate the great embankments that burst upon the vision and give one

an impression never to be forgotten. Although it is more inconvenient, visitors should leave the train at Blanchester and drive to Fort Ancient, entering it by the east road. The view thus obtained is surprisingly beautiful and it excels in its impressive grandeur anything in the way of a picture of prehistoric ruins in America. If visitors to Fort Ancient come by way of the railroad in the valley, they should drive through to beyond the Fort, and then turn about and approach it in the manner the writer has described.

The elevation crowned by Fort Ancient is of interesting geological formation. The glacial action has been intense as is evinced by the numerous ravines, and one understands it better if he will take the pains to walk down the railroad track to below the South Fort.

These ravines do not cross the railroad track and empty into the river; the soil in the river bottom is very sandy, and the water brought down from the hills by the ravines is quickly absorbed; there is no wash, no erosion. The points of land or rounded hillocks between the ravines are mostly gravel. The presence of this gravel in the localities referred to is due to glaciers or icebergs. The points are quite round, and of so regular outline that they have frequently been mistaken for mounds. But they are natural, not artificial. The valley was probably a lake formed by a dam or gorge of ice at the lower end.

When this valley was a lake, the icebergs and cakes of ice, which carried more or less gravel, were floating around in it, and many of them driven by winds or drifted by currents, stranded on the hill, and there deposited their loads of gravel. The slope of the hill was once all gravel, and probably presented a regular appearance. It is rather peculiar that while such extensive deposits are found on this (the east) side, there should be none, or but very little, on the opposite or western side of the river. The numerous ravines have cut out a great deal of the gravel, and have given it the present irregular outline. We dug into a number of these rounded points, and found glacial gravel less than a foot from the surface. Back farther on the high

ground, where the fort lies, the drift is not so heavy, and is clay. Immediately below this glacial clay lie the limestone and clays of the Cincinnati group, which comprise the greater part of the hill and extend downward for several hundred feet. This limestone, as all know, is exceedingly rich in organic remains, and the entire Miami valley is noted among geologists as a field for fossils.

Students of Fort Ancient who wish to understand the place thoroughly should accompany the survey entirely around the circuit. This is somewhat tedious but by no other method will one gain a comprehensive idea of the size and character of the enclosure.

The instrument was set just south of the Lebanon and Chillicothe pike on the east side of the northern section of the fort where the road passes out. This is "station 0," from which we make all calculations and measurements. Plate V, is a summer view of the long and heavy embankment from 0 to station 7. This view was taken at 1,000 feet distance, and the camera was pointed east. The frontispiece, Plate I, shows two sections of the embankment— a nearer view. This is from station 2 to station 4, and is at a point where the embankment is the highest. On the outside of the walls at station 0, and extending past station 7 to the edge of the woods, is a deep and wide moat, which follows the base of the embankment and serves as a protection. At station 7, this moat becomes a ravine washed out by natural forces.

From the two mounds just east of the fort walls, there is a shallow ditch leading toward the south-west, where it deepens into a natural hollow. Our attention was first called to this ditch by Mr. George Ridge, one of the owners of Fort Ancient who has lived alongside the earthwork for fifty years, but Caleb Atwater refers to it in his book. There were a few excavations made at various points in this ditch, and some things of interest found.

One hundred feet south of mound an excavation large enough to permit two men working at one time, revealed the original surface of the ground 2 1-2 feet deep, and pottery fragments, animal bones and burnt stone in the bottom.

PLATE X.
The Great Gateway as it appeared in the Summer of 1889.

Three hundred feet further south another place was opened, and here the original surface of the moat was found to be over four feet below the present sod, or grass line. It is apparent that when dug, the ditch was five and a half feet deep (or more). From the surface to the bottom, the soil was unusually black and "mucky." Possibly this condition was due to decay of vegetable matter — of water standing long in one place — or to some unknown agency.

Numerous pottery fragments, mostly large, and quantities of animal bones were removed. For many years the plow had crossed this ditch and although the soil was very mucky, it was not as heavy as that found nearer the fort wall in moats, where it seemed almost like peat. To the writer's mind this is an indication of Fort Ancient's age. Such muck cannot form in a few generations, one is led to believe.

It is probable that wigwams occupied the land along the ditch—which was outside the embankments of the New or North Fort, it should be remembered—and the refuse found in it was thrown in. A complete exploration of the ditch may result in discoveries of note.

Its purpose is, first, for protection; second, to obtain material for the construction of the fortification. Nearly all the earth for the formation of the embankments was taken from the interior of the enclosure. The ground inclosed is somewhat lower than that outside; the clay layer is very thin, as if it had nearly all been dug up. In some places the loam or surface soil rests upon the limestone, there being but a few inches of clay remaining.

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Just opposite each opening in the wall, or, as we prefer to call such places, gateways, the moat has the appearance of having been filled up. Upon close inspection, however, we find that the moat was not made continuous; it stopped short at the entrance. The earth was dug out on each side of the gateway, thus leaving a narrow road on a level with the surrounding plain. This roadway may have been used as a means of egress and ingress, and would be more convenient than had the moat been carried through without a break. At station 3 in the map, one sees a platform or fan-

shaped mound thrown directly in the gateway. It extends out toward the east, and forms quite a wide roadway across the moat. From its general appearance and its connection with the gateway, we conclude that it indicates the principal entrance to the inclosure.

The embankment at station 1 is 22 feet in height, measured from the level outside. The moat on the exterior is two feet deep, and was once five feet deeper than at present, which would give the wall an altitude of 29 feet. As the embankment was once much steeper than now, the barrier would be impassable.

At least so it seems, after one has restored it in his imagination to such form and condition as it must have presented when completed by the builders. Not so difficult is such reconstruction if one is willing to devote weeks to a careful study of the depressions and elevations. By contrasting one place with another—that is, other earthworks in Ohio—and by comparing different parts of Fort Ancient, the observer is able to learn much.

In excavating in the moats, traces of wood were encountered. In some places, the fragments were readily distinguished, but they were too badly decayed to admit of identification as to species. These fragments may have once been logs that were placed in the openings and used as a bastion. The traces, however, are too slight to determine anything with certainty as to their purpose.

The last station is on the north of the road, just opposite station 0, and is station 407, as has been previously stated.

The wall rises slightly from station 0 to station 1, so that the latter is the highest point upon the entire fortification. Standing here, one can see that the earth which composes these great embankments was taken, for the most part, from the interior of the inclosure. The ground inclosed is somewhat lower than that outside, and there is little clay; the top soil or loam seems to rest directly upon the limestone. We say "for the most part," because a great deal of the earth was taken from the exterior moats.

The space between the walls at this station is on the same general level as the outside field, but a platform or

graded way has been thrown up in the gateway, which leads down in the interior. This has been so cultivated that its original shape can not now be determined. The next two stations that are gateways, we notice, as we go south along the wall, have no platform thrown up in them, but are cut down to the general level of the surrounding plain. The length of these three walls is 85, 110, and 159 feet respectively, and they are about the longest stretches of embankment that we have. There are three large poplar trees upon these straight embankments. On the authority of a Cincinnati botanist in the publication of the survey and observations of 1889, the writer stated them to be 100 to 150 years of age. This statement may not be correct, although personally, the writer believes it. Old residents of Fort Ancient state that these trees were practically of this size when they first saw them. Growing 20 feet above the surrounding level they appear grand and imposing, standing like sentinels upon the walls, and one is impressed with their beauty when viewing the fort from a distance, as they are seen towering far above the other forest trees.

At station 10, the wall passes into a heavy woods, which it follows, sometimes being entirely surrounded by forest trees, again bordering on a cleared field, for the whole extent.

Plate VII (p. 43) is a view looking north along the top of the wall from station 12 towards station 1. The embankment makes a sharp turn here, and we could get a very good photograph of its height. This photograph, when compared with Plates I and IV, will show the massive structure of Fort Ancient. In speaking of these gateways, the reader must not infer that every opening is a gateway. We use the term gateway because we have not a better one. It is probable that wood-work was built around the outside portion of the openings, and they were used for additional defense, somewhat like bastions in a modern fort. Between stations 11 and 22, we notice an interesting thing: a depression follows the wall to station 16, where the wall was built directly across it; the ditch, being changed by

this means, follows uninterruptedly around to station 22, where it joins a ravine which breaks through the wall.

Since the wall was built, the ditch between stations 16 and 22 has washed out to a depth of 16 to 18 feet. Just beyond this point, and at station 19, a spur of land runs out into the hollow; which spur has been used as a bastion. Many of these spurs may be noticed at frequent intervals of the fort, and they are always natural, and have not been artificially shaped. In many places on the outside of the wall, the bank has washed considerably, but the wall itself, being of tough clay, which does not easily erode, is still very plain. On the opposite side of the ravine, at this station, 22, the wall does not extend down the slope, the end of the wall being at the top of the bank. Some ravines were probably very small when the fortification was built and the wall was carried over them, but the larger ones could not be protected. Many of these have since washed out, and the washes in some of them are quite old. Some indication as to the age of the fortification can be obtained by studying them.

Up to station 36 there is nothing of special interest, and the reader can look on the map for the bastions, spurs, etc., and see them for himself. At station 36 the wall was once built solidly across a deep ravine, but it has since washed out. The builders appear to have made no provision for drainage at such points. The streams flowing through these hollows would necessarily wear away the embankment, and in process of time destroy it, no matter how heavy and strong it might be made.

The moat at station 42 is still on the inside of the wall. At station 44 a narrow level space extends from the foot of the wall on the interior with a moat or ditch on each side. There is no depression in the wall at this point. Opposite stations 33 and 34, over in the woods to the south, and across a deep hollow, are three small mounds. These were explored, but little was found. They will be described later in Chapter V. From station 45 to 47 there is a deep hollow. The wall seems to have been built at one time clear across the hollow, without a break, but it now extends

PLATE XI.

A Portion of Old Fort Walls, near the Great Gateway. Camera pointed Northeast.

only part way down the slope on each side. At the stations just named there is considerable stone showing in the wall. It was probably put in to keep the wall from washing.

The ravine is deep — about 100 feet — and the slope quite steep. But for a heavy growth of grass and brush, the erosion must have been considerable. But these deep depressions are so sheltered that ferns and kindred plants grow profusely and the hillsides remain intact.

At station 57 another of those bad washes occurs, where the wall has been built solidly across the head of a ravine, but it was cut through for drainage by a farmer, and "the result is as usual." The entire embankment has washed out within the last few years.

At Station 63 begins the narrow neck of land which is known as the Isthmus, on which the Crescent Gateway and the Great Gateway are located.

At stations 76 and 77 there was formerly a curve in the wall, but a ravine has obliterated a considerable portion of it, and where once stood a beautiful and graceful stretch of embankment, now remains an ugly and unsightly depression. At the stations just mentioned there is a glacial deposit, consisting of gravel. When built, the wall was probably near or at the head of this ravine, but the hollow has washed back since that time to its present position, nearly 40 feet further inland than the west extremity of the wall.

At station 80 the wall seems to have stopped at the edge of a large ravine near the head. Just opposite this point, at the foot of the wall on the opposite side, it makes a sharp turn toward the interior of the fort, which would leave a deep depression between the two walls. This depression seems afterward to have been partially filled, making a path-way or passage-way from one wall to the other. On either side of the connecting-way is a moat now nearly filled. The arrangement of these walls seems to have been very much like that at stations 76 and 77. At station 80, half the earth being of clay, the erosion was not so pronounced as in the gravel of station 76, hence this place is still intact.

At station 85 there is a large bastion, which overlooks the spur. This spur is very long and level, and 150 feet to the east of this station is a large stone grave, which contained the remains of skeletons. Many of the spurs on the east side of the Isthmus have on them stone graves, nearly all of which were opened by our party.

From station 88 the wall was built solid across a small ravine, but has since been broken down by erosion. From this station to the end of the New Fort, the embankment is built on the hill-side, and in several places its top is lower than the summit of the hill. The distance across the Isthmus to the wall upon the west side is slight, being not over 100 yards. The ravines on each side very nearly divide the hill into halves, and about 100 feet north of the Great Gateway they come so close together that the distance between them is barely 60 feet.

At station 89 and at station 306, on the opposite side, begin the circular or crescent-shaped embankments, which run out from the east and west walls. This spur we have named Crescent Gateway, on account of the beauty of the curves at this point, and in order to distinguish this gateway from the Great Gateway, or the one dividing the Old and New Forts.

At station 102 the Great Gateway begins. This will be fully described later on, when each interesting portion of structure is taken up and enlarged upon in detail.

At station 105 there is a moat on the inside with no platform or approach to it from the outside. It leads down from the two walls of the Old Fort to the head of a large ravine. If a gateway, it would be difficult of approach from the inside; if a bastion, it would require a great amount of work to make it defend any thing, as it is 100 feet back from the head of the ravine. In coming out, by turning to the left, at the foot of the first mound, one could easily reach the Isthmus outside, and it is possible the opening was left for this purpose.

Station 109 is similar to 105, and is an opening in the wall leading directly into a ravine with no approach from the inside. Like station 105, its purpose is conjectural.

At station 110 begins a terrace, outside of the wall, which gradually widens in extent, until it passes station 112. It is covered with stone heaps, the exploration of which will be described later. This terrace has been omitted from all previous maps of Fort Ancient, and the only reason we can assign for this omission, is that it is located in the wildest portion of Fort Ancient. The fort wall above is cleared on top, and there is a nice, level path extending around. One could look down into a mass of wild grape-vines, underbrush, logs, rocks, etc.; people did not care to investigate in such a place, it was much nicer and easier walking on the embankment above, so they left these most interesting parts of Fort Ancient for years undisturbed. Mr. J. Thomas Brown of Waynesville, Ohio, a geologist, has made a study of Miami Valley terraces and in the *American Antiquarian* (Vol. X, p. 167), he published a paper, — "Prehistoric Artificial Terraces in Ohio." In this he treats of Caesar's Creek terraces, six miles north of Fort Ancient. They are identical with terraces found on both sides of the river flanking the earthwork, and therefore the writer quotes a portion of Mr. Brown's remarks: —

"One of the most interesting groups is on Mr. Hisey's farm. The whole hillside is wrought out into broad platforms, the upper one being the broadest and shortest, the face of the hill behind, having been dug away so as to form an amphitheatre with an arc of about 180 yards. There is a similar example though not so large on the south side of the creek.

"As a general thing the terraces, when in groups, are from 200 to 300 yards in length. Some single ones are much longer.

"The aggregate length of those which have been discovered and traced along Caesar's Creek is more than 5,850 yards, or considerably exceeding three miles; besides which it is most likely there are some which have as yet escaped identification. In places they are obscure and a practiced eye is needed to detect them, nor is this to be wondered at, on these steep hillsides. There must have been some waste

to the width of all of them, through the action of frost and water on the lower side, and a constant tendency in the mellow loam on the hillside above to slide down upon the terraces for the same reason, so that all of them must be narrower than when they were left by their builders; but in most cases they are remarkably distinct and well preserved.

* * * * * * * * *

"The idea that these terraces are merely landslides, is too preposterous for lengthy consideration. That there are landslides there, is true, though not so many as has been supposed, but they can readily be distinguished by the practiced eye from the work of man. In one instance the whole hillside has been broken down from top to bottom and the surface left in uneven billows for a distance of several hundred yards, due, it is said, to the earthquake of 1812. The terraces are uniform, horizontal, often repeated.

"A like sweeping objection can be made to the theory that they are alluvial terraces or in any way due to the action of water; their position is too variable along the hillsides; they are not composed of the right materials, nor is the geologic history of the valley such as to warrant it. And above all, there is too obvious a method in each terrace and in the groups of terraces. They are platforms built out from the bluff side, generally without much show of excavation along the upper side of the terrace. The earth seems to have been in a measure brought from somewhere else, from the loose surface soil, most likely, wherever it could be most easily obtained. Sometimes the signs of excavation back of the terraces are more readily seen. They are, unqualifiedly, artificial, and would have been so recognized and described long ago, but no one had ever seen them all until this late exploration, and the knowledge of them in detail was entirely wanting."

The Fort Ancient terraces are: above the enclosure, below the enclosure, opposite the enclosure and across the river on the western hills. Levels of these were taken by Mr. Cowen.

One on the western hills, across the river is 137.7 feet above low water stage in the Little Miami.

The second terrace, at Mr. Ridge's, north of the fort, is 136.6 above low water.

The terrace on Mr. Cowdin's place, just along the fort hill, is 135.2 above low water.

These are very remarkable figures, there being but little more than two feet of difference between the lowest and the highest. This is the more remarkable, when we consider that at one point, where the level is nearly the same, the terraces are nearly two miles distant from each other.

The question at once arises, could they possibly be due to natural causes? Does nature ever observe such regularity of platforms, whether made by geological deposits or land-slides?

No other answer can be made to these queries, save this: that the terraces are *artificial;* that they were built by *men.* We excavated in various parts of them, and our investigations go far to settle the question. We have found in them flint flakes, and a few pottery fragments, several inches below the surface; and, in three cases, scales of flint and pottery fragments, one foot in depth. These facts go far in establishing the human origin of the terraces. Obviously, they were occupied by men; used by them for some definite object; for exactly what, it is difficult to tell.

Atwater says they were used by the Indians in their wars with the whites; and, in marching against a tribe, they would traverse the terrace as far as it extended. It is noteworthy, also, that these terraces are both numerous and extensive. That which is on the west side, overlooking the river, runs for a distance of over a mile. It runs from Mill Grove, on the south, to opposite the railroad station at Fort Ancient, on the north.

At Waynesville, 10 miles up the river, there are a number of clearly defined terraces of undoubted artificial origin along the hill-sides bordering on Caesar's creek.

Attention has been called to these by Mr. Brown, of Waynesville, and others. They are of the same appear-

PLATE I.

A Distant View of Part of East Wall of New Fort. Camera outside of Embankment, 250 yards distant and looking West.

PLATE XII.
East Wall of Great Gateway, at the Highest Point.
Camera pointed West. The View is from the Base upward.

ance, and character, and purpose as those connected with Fort Ancient.

There is an interior ditch from station 110 to station 123. At station 113, the terrace begins again outside the wall, and extends, sometimes, only a few feet in width, but does not disappear until we reach station 122. There are graves upon this terrace, between stations 113 and 116. Opposite station 115, there is the largest single heap of stones to be found on Fort Ancient, and it may contain as much as 100 tons.

Station 116 is a gateway with an interior approach which leads down to the terrace. The outside of the wall at this point is very high and very steep. Between stations 119 and 120, the wall of the fort has been built solid across the head of a ravine, but has washed out. From station 110 to station 123, the wall is built lower than the top of the hill, and this is what forms the interior ditch. The earth for the wall is excavated between stations 110 and 123. From this point on to station 187, is a succession of washes, spurs, and bastions, which are quite similar in character, and which do not need further explanation, as they can readily be seen on the map.

Station 187 is on a very high portion of the wall, and is the south-west corner of Fort Ancient. It is generally called a mound, and is built directly across a spur. From station 190, which is at the foot of this high embankment, often called a mound, the wall is built down the slope to the bottom of a ravine, and up the slope on the opposite side; traversing thus the entire ravine. The wall has suffered to some extent from rains and floods, but is still distinctly traceable. The wall at this point makes an abrupt turn to the north-east, which trend it keeps quite accurately for some distance. At station 194, there is a gateway which has a level approach from the interior of the fort, and there is a moat or ditch on either side of the roadway. Many stones are in the opening, and it opens out upon a spur overlooking the river far below. A large stone grave covers the spur.

At station 201, there is a bastion overlooking a deep ravine, and at the corner of the fort there was once a considerable pond, but some one has cut through station 201 to drain this pond, therefore, the wall has washed badly.

At station 209, there is about the largest ravine in the fort. The wall is built down the slope of this deep ravine, solid across the bottom, and up on the opposite side. There is a gap in it through which the water passes during rainy seasons. It would require a strong wall, with some means of outlet, to prevent its washing down in heavy rains. Considering its position, it is one of the best preserved walls in the entire fort. On the spur opposite station 224 (on the river, or west side), is another stone grave. The fort wall has extended for some distance along the edge of a hill overlooking the Miami, and will continue to do so until we pass station 250. There are two large terraces between the top and bottom of the hill, the upper one of which has many graves upon it. Terraces were favorite burying places

Just beyond this deep gulley, is a place where the wall is built across the head of a ravine. There is such a depression above, that if this wall was built to the height of ten feet, it would make a pond of nearly or quite half an acre. This looks so much like a reservoir, that I am tempted to consider it such.

Station 231 may be either a gateway or a bastion, and overlooks a regular slope on the outside, but there is no spur leading direct to the river At station 248, there is a narrow spur which runs out nearly on a level with the interior fort. The wall here, as will be seen in the map of the fort, runs out to a point, and overlooks the valley below. One mile up the valley—more or less—the river-bank village site is in distinct view. Were the timber cleared, much of the New or North Fort could be seen. If lookout stations were in use among the builders, then this was one. An arrow can easily be shot into the Miami river below. Experimenting with an English yew bow which pulled sixty pounds, the writer was able to throw a steel-pointed arrow clear across the stream and fully fifty feet beyond the western shore. The view is beautiful and

an illustration, taken from Mr. Tichenor's "Guide to Fort Ancient," is presented in Plate XXI, p. 97.

Stations 245 to 250 comprise the point of the spur, and in the interior there is quite a deep depression clear around; the earth has been taken for the embankment from the inside. There is a roadway leading down to the mouth of a large ravine, near a spring, and near the river. At station 250, there is a depression in the wall, where it has been built across a ravine. A portion of the area within it has filled up level, but the embankment without is very high and steep. On the spur on which 248 stands, the wall is built below the summit of the hill as far as station 252, at which point it returns to the crest. At station 267, there is a moat, on the interior. This moat is unusually large and deep, and holds water the entire year. It was once undoubtedly much deeper: the mud in it is quite soft, and somewhat of the nature of a quagmire, as a number of cattle have mired and perished in it before they could be extricated.

At station 267, there is a gateway, and at stations 268 and 269, there is a graded way leading down the hill to the plain below. In the deep ravine beneath this point, are several excellent springs of water, and it is possible that a pathway led hence down to the springs, and that the hill has been artificially worked to secure an easy approach. Station 286 is the end of the embankment or mound on the west side of the Great Gateway. Station 287 is the middle of the entrance to the Old Fort, between the two so-called "mounds."

There is a platform mound inside this entrance, which leads down to the level within. Underneath the embankments, and in this platform, there is a large amount of rock chiefly limestone slabs such as lie about the surface of the Great Gateway.

The portion of this platform extending toward the south was found to contain many human bones.

The platform is about four feet above the general inside level. From its appearance, we think it was built before the Great Gateway was completed. It was not an addition; the whole part of the fortification was built at the same time—the southern part.

PLATE XIII.
A Corner of the Old Fort, west side. Camera pointed Northeast.

From station 289 to 290 is a deep ravine, which has been washed out of the gravel deposit by both underground and surface drainage. This ravine extends well within the walls at present, but it is probable that, when the fort was built, the wall ran just to the head of it, as in similar cases at other points in the fort. The wall has been built up around such places, and it is quite likely, also, that the wall extended much further than station 290. The present end, as it stands, reaches to the edge of the ravine, and caves in more or less every year. Before the wall was built, most of the drainage at this point went down in the ravine, which heads at station 294. The wall being built across the head of this ravine, would cause the water to run along the inside foot of the wall, until it reached the present washout, which it would assist greatly in excavating.

At station 295, the wall is composed almost entirely of stone, which shows on the outer slope for fully 20 feet below the top. There is much stone in a gateway at station 301.

At station 307, is a depression, where the wall crosses the ravine, which, however, is now filled up nearly level with the adjacent surface. In this immediate vicinity (station 306), begins the crescent wall, just within the fort wall.

At station 309, there is a gateway, on the exterior of which is found a large quantity of rock. This gateway leads along a gentle slope of drift gravel, and at the end of the slope is a round knoll, at a distance of about 600 feet from the wall. The knoll is about 25 feet higher than the ridge on which it stands, and from its top there is a regular and gentle descent to the river bottom. The descent is quite uniform, with no juttings or breaks in any of its parts. Viewed from the river side, the slopes that fall away from the knoll are so symmetrical as might almost induce the belief that they are artificial. All the spurs and lower hills outside the fort wall, between the ravine which empties opposite station 248 and the ravine which forms the northern boundary, including the entire hill up which the pike winds its way, are of glacial origin.

Between stations 322 and 329, the wall is built slightly below the top of the hill. At station 324, is a bastion or

gateway leading out on a long spur toward the spring. At station 328, there is a bastion, overlooking a deep ravine.

From station 320, the wall is built down the slope of a deep ravine almost to the bottom. On the opposite side, the wall extends up the slope from the bottom to the top. It is probable that the wall was built solidly across this ravine, and has been washed out. On the west side, the wall seems to have deflected the water and made it strike against the wall on the east side, as the slope of the ravine on each side is as steep as earth will lie. Erosion at the bottom of the wall would cause the part above to drop or slide down to the lowest part, and be washed away.

There is a small mound 100 feet due north from station 334. Station 337 is a bastion or gateway, with level approach on the interior, with a moat on each side opening out on slope leading down to the side of the large ravine.

At station 339, the wall is built across the head of the ravine, and is washed out. At station 342, there is a shallow depression in the top of the wall, where the embankment makes a sharp angle. In the interior, is a level approach, with ravine on one side and a deep moat on the other. This gateway leads out on an easy slope down a narrow ridge of drift gravel, descending gradually to the river bottom. Station 345 is a bastion. Station 349 is a gateway, with interior level approach, a moat on each side, leading down along the edge of a deep ravine, giving an easy descent to the bottom below. From station 352 to 353, across the big ravine back of Mr. Howard's house, there is a break in the wall. It is not probable that the wall was ever built across this ravine. Some other mode of protection or defense was necessary. The sides of the ravine are so steep, and the force of the water so strong, that the earth could not have been made to stand.

Between stations 357 and 358 the wall was solid, with a sharp turn, almost a right angle, across the head of the ravine. Here there was a moat or small pond inside the wall, and the owner of the land, or some one desiring to

PLATE XIV.
Old Fort, near the Souhtwest corner.

drain it, cut a small trench through the wall, which was built on a gravel deposit. The water soon began to undermine and cut out a wide ditch, and in spite of efforts to prevent it, the wall on each side caves in more or less every rain. The gap is now 57 feet wide, and will continue to increase unless some effective measures are soon taken to stop it.

At station 360 is a gateway leading down hill on a narrow spur toward the railroad station. Between stations 363 and 364 the pike passes. This was apparently one of the main gateways of the fort. On both sides of the pike within the wall, the earth has been excavated to a large extent to be used in the walls. The pike, however, follows the extent of a kind of platform, having the original level for a width of 70 feet, from which part no earth was removed. It has the appearance, viewed from the entrance, of an artificial elevation, but is simply the original surface left to make an easy passage. The first wall on the north side of the pike, although very heavy, forms a crescent, almost a semi-circle. A large amount of earth has been excavated just within to be used in the construction of the embankment. Formerly this contained water to a depth of several feet during the entire year, but it is now almost entirely filled up with decayed vegetation. Station 367 is a bastion overlooking a narrow spur that runs out between the road and a deep ravine on the north. Its gateway could not be reached from the interior directly on account of the pond above mentioned. It would be necessary to approach it from one side or the other on the wall. There is a depression where the wall was built solidly across a deep ravine, but has washed out. At station 374 there is a gateway leading down to a deep ravine on the north. Beginning at station 375, there is a terrace on the outside of the wall which extends as far as station 387. From station 370 to station 388, the wall is built below the top of the hill, on the slope. Between stations 378 and 379 the wall must have been heavy across the ravine, but it is now washed out. A natural ravine has

formed by water running along the inside of the wall, which in process of time, has cut its way through the embankment.

Station 382 is a gateway which leads out upon the terrace. At station 386 the wall was once solid, but was pierced for the passing through of a road, so it is reported; but, from the indications, we think there was a gateway there, and very little, if any, excavating was done to allow a wagon road to pass through. There are large flat stones in the bottom of the wall at this point, and they crop out at the edges and can be plainly seen. At station 390 there is a bastion opening out on a ravine. On the interior there is a level, but the gateway is slightly higher.

At station 394 the wall was once built across a small hollow, but for some reason unknown to us was left quite low, so that it has the appearance of having been washed out, leaving a depression about twenty-five feet in width.

This has an easy approach from the interior, and on the outside leads down a slope to the bottom of the ravine, at a point where a branch comes in from a good spring in the field north of the fortification. There is a regular passageway through station 397 to the mouth of this branch. The spring has unusually cold, clear water, and it seems as if an artificial channel led from it to the ravine at the place mentioned.

Station 402, at the north-east corner of the fortification, was probably a bastion, as it opens down into a ravine; but it may have been a gateway leading out to the field north-east. Station 405 is a gateway opening out toward the large mound on the east side of the pike. This gateway has a great deal of stone in it.

Between stations 407 and 0 the pike passes.

The summary of the survey may be stated in the following figures:

Total length of the walls of Fort Ancient	18,712.2 feet.*
Length of the parallel walls . .	2,760 "
Length of the crescent in New Fort.	269 "

Distance in a straight line from stations 187 to 389 (the most distant points north and south) . .	4,993 feet
Total length of terraces within one mile of station 0	$5\frac{3}{4}$ miles.
Grand total of artificial work in length	$10\frac{17}{52}$ miles.

The parallel walls are 2,760 feet *each*; readers must not fall into the error of considering the above the length of both taken as one continuous embankment,

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*This length of the walls is obtained by measuring and surveying the center of the embankment on top. There is no allowance made for spurs, bastions or elevations. The Crescent Gateway is not included. Were these added we would probably have a total length of 21,400 feet.

CHAPTER III.

THE POSITION OF THE FORTIFICATION. POINTS CONCERNING THE GATEWAY AND THE MOATS

It will be observed, on the map, that in the center of Fort Ancient extends a long, narrow isthmus, flanked on each side by two deep and precipitous ravines. The width of this isthmus ranges from 100 yards at its widest point to a contraction compassed within 100 feet. Natives were compelled to traverse the isthmus in passing from one fort to the other. Taking one's point of view from the western walls, it begins at station 309 on the north, and extends to the Great Gateway, or station 288 on the south. In order to understand this isthmus and the central part of the work, which is by far the most interesting portion of the entire fortification, we will call the attention of the reader to Plates IX, X, XI, and XII. In Plate IX, at page 46, it will be seen that the road which extends through the entire length of the fortification passes between two large high mounds. They stand about 300 yards south of the point where the camera was placed for the taking of this view. These two mounds are about 20 feet in altitude, and at the base are ten feet apart, leaving just space enough for a wagon to pass between them. At their bases and between them is a raised platform four feet in height. This is more extensive on the side next to the Old Fort than on that lying toward the New, and when examined it was found to contain many human bones, in small fragments and much decayed. When within 103 feet on the east and 143 feet on the west of the Great Gateway, the embankment coming from the north on the edge of the isthmus on each side abruptly terminates. For a distance of 103 feet on one side and 143 feet on the other there is no embankment, the ravines having such a steep angle on each side that further protection was unnecessary.

Plate X, at page 52, will show the surveying corps as they stood on the mound and in the gateway. This plate

PLATE XV.
End of a Low Embankment, East Side of Middle Fort. Picture taken in 1889. (Station 86.)

also furnishes a close view of the Great Gateway, and by the figure standing on the summit of the mound to the left, or east, one will obtain an idea as to its height when compared with that of a man of six feet.

It may not be improper to observe that in some of the pictures with which this book is embellished, trees and foliage are very conspicuous, often hiding the walls. It was impossible to secure photographs otherwise; and this constituted the main difficulty which we encountered. Nearly the entire area of Fort Ancient lay in a forest so dense that no little clearing had to be done before photographing, surveying, or excavating, could be done with satisfaction. Mr. Williams, who took views of the structure in the winter of 1905, for the writer, labored under no such disadvantage. Not only was the season propitious, but the fort is more open than formerly, much of the underbrush having been cut away.

All about the Great Gateway are masses of stone which were employed both as coverings for graves and as a protection to the embankment. Recently many of these have been hauled away by farmers. They are most frequent on the east side in a depression between stations 101 and 103. At this point the embankment is the steepest in the entire earthwork. At the base and protruding from the sides are many large water-worn limestones. These must, at one time, have been piled up in the form of a rude wall to strengthen the base of the embankment. The average size of these stones is 18 x 20 inches, weighing probably about 40 pounds each. Human bones are numerous in the soil under them.

Plate XI (p. 57) exhibits the east mound-shaped wall of the Great Gateway.

The road passes between them, and is four feet higher than the surrounding level on account of the platform mound which lies in the opening.

From the Great Gateway the two walls which constitute the Old Fort sharply diverge. One runs directly east, the other south-west. The wall running east soon swings around to the south; the other wall runs in a very irregular

manner, being more tortuous than any other portion of the entire structure. About twenty-five stations beyond the Great Gateway, it assumes a southerly direction for quite a distance.

Immediately to the left of the Great Gateway there is a deep depression between the walls, which is filled with rock. These rocks are not the coverings of graves. They are stones that have been used to form a sort of wall at the foot of the embankments. By thrusting an iron rod into the bank at almost any point, one can feel stones still standing as they were originally placed. The earth from above has washed down and covered them up so that they now appear as if they had been originally covered with earth by the builders. Such is not the case. The stones were on the outside of the wall; the earth has since run down from above and covered them. Many of the stones have fallen down and formed a heap about the base of the high steep mounds at this spot.

Plate XII, page 63, shows how steep and high the embankment is just above the spot where lies the stone wall described. The figure at the top is that of a six foot man. Compare his height with that of the embankment.

Of both Old and New Forts, the interior is cleared, but there is left a fringe of timber extending all around the Old Fort and part way through the New, thus affording a source of protection and preserving the embankment as nothing else could. We find beech, walnut, oak, ash, elm, dogwood, poplar, and hickory. The beech is more numerous than other trees, and its roots spread out over the surface, forming a perfect net-work in places over the wall, and together with the moss, which is so abundant in many localities, affording an efficient barrier against erosion.

The places where the embankment has recently washed are those upon which cattle have stood and cut the earth with their hoofs, and thus started a small gully, or where some one has cut a drain through to allow water which has collected above to escape. The embankments of the Old Fort are markedly more irregular and crooked than those of the New. Their construction must have been more difficult.

At page 84 (Plate XVII) there is shown the outside slope of the fort wall, near station 280. The earth at this point has been dumped on the edge of the hill and allowed to fall down upon the outside, which has made the outside slope of the ravine very steep, perhaps 35 or 36 degrees. The height on the inside of the wall at this point is only nine feet. We trace earth artificially deposited at the base on the exterior 50 feet from the summit. There is considerable timber on the slope, as will be seen in the illustration, and the growth of grass and weeds is very heavy. We observe a moat here, within the enclosure, and from its size conclude that much earth was removed for the embankment.

The moat is of such extent in depth that water stands in it in places. Alongside the embankment, west of the Great Gateway, we dug in the moat to determine its original depth. Although at present it is but two feet deep, our examination led us to believe that when the aborigines completed it, the depth was five feet greater than at present—a total of 7 feet. The earth to a depth of two feet was exceedingly dark and heavy. Four feet from the surface were pottery fragments, chips and flakes of charcoal. The bones had probably decayed. From the bottom of the moat to the top of the wall is 16 feet. But as soil from the wall had washed into the moat, the total distance was, we are convinced, at least 19 feet.

Plate XX presents a bit of the Isthmus. A little spur juts out a few yards toward the west. From this point one commands a splendid view of the valley far beneath. It is possible for one to discern the hills flanking the river and Oregonia, three miles up stream, or north. The embankment is not steep and varies from four to seven or eight feet in height. In building the walls high, the earth was thrown over the edge of the bluff. One is able to differentiate the artificial slope from the natural. To the left of the picture the Isthmus contracts and the walls come nearer each other. At Station 296 (not shown in Plate XX), the embankment runs north and south and is made heavy at the head of another spur. At Station 296 there is an open space in front of the embankment, filled with stones, the design and use of which is by no means easy to explain unless they formed the walls at the base of the embankment.

CHAPTER IV

REMARKS UPON THE ILLUSTRATIONS. POINTS OF INTEREST. GATEWAYS AND DITCHES.

Standing on station 0, which is to the extreme right in Plate III, one has an uninterrupted view across 2000 feet of New Fort. To the left are the two mounds without the enclosure (see Plate XXIX). The fields are cleared on either hand, and far to the west, a quarter of a mile away, is the other side of the fort wall flanking the river. Note the difference between these embankments in summer and winter. The frontispiece is from the exterior of New Fort, the camera placed 250 yards distant and looking west. In Plate II the camera is brought nearer. In Plate IV, long, straight stretches described in Chapter II are clearly indicated. 1000 feet of embankment is shown, and in Plate V there is a summer view of the same walls as are observed in Plate IV. But in Plate V the view is from the inside of the fortification. Station 0 would be slightly to the left of the margin and is not shown.

In Plate VI we are west of the center of the New Fort and look at embankments flanking the Little Miami valley. Plate VIII gives a glimpse of the valley beyond the west wall of the isthmus. The lowest embankments are shown in Plate XXII. The road made use of by those who drive from the turnpike in the New Fort to the village site in the Old Fort is in the foreground. As the embankment is but four feet in height and does not appear to have ever been either steep or high, one queries why it should have been so weak at this particular place. Several theories suggest themselves. One, that palisades were planted to strengthen the wall. Another, that the wall was not completed at this point. Certain it is that the amount of earth now in evidence could not have constituted, originally, a wall of more than 6 or 7 feet in height Although the writer is unable to prove conclusively his belief, he is of the opinion that the embankment was not completed.

PLATE XVI.
Giant Embankments of Extreme Southern Part of Old Fort. Camera 150 yards distant, looking South.

Plate XXIII illustrates how that a small washout, through neglect, may become a menace. This serious break in the wall has occurred since Atwater's time. The State has since built a heavy retaining wall and further damage cannot occur. The washout was 57 feet in width and nearly 45 feet deep, or more than 20 feet deeper than the original height of the wall. However, the damage is not without its recompense, for the exposed sections show clearly the composition of Fort Ancient's embankments. There is variation in color and material, indicating that the natives scooped up amounts of earth varying from a peck to half a bushel, some working in loam, others transporting clay, and again those who carried stone. In the center the stones assume the shape of a rough layer. On the other side the stones weighed as much as 10 pounds each. There is a travertine coating on the stones — a natural formation. It is quite likely that the wall — at least here at station 363 — was built at two periods, separated by an unknown length of time. Vegetable matter accumulated between these layers, and when the wall was completed, this material lay between the first and second sections. The line of division is half an inch thick, is dark, clearly marked, and precisely such as is found in mounds, denoting different periods of construction. While loam and yellow clay predominate, not a little blue clay appears. Such material the builders must have taken from ravines and the limestone beds.

There has been frequent reference to limestone slabs so numerous about the Great Gateway, in the end of embankments and on the outside of the walls. By thrusting an iron rod into the earth at almost any point in the wall, these stones can be felt. Over most of them is a coating caused by carbonated water, flowing over them and dissolving a portion of the stone. In places where the stones are heaped up they seem to have been held together by a cement. The coating is travertine and due entirely to natural causes. Some early writers on Fort Ancient have called it "Mound Builder cement" — which, of course, is absurd.

The amount of stone and its position indicates that the builders constructed a stone backbone entirely around the

enclosure. This varied, but usually it lay near the center of the embankment. It is quite likely that on the exterior stones were laid up forming a wall sloping slightly backwards — as they naturally would lying against the curve of the embankment.

Within the New Fort is a semi-circular, or crescent-shaped, embankment, somewhat injured by the state road running through a portion of it. It will be seen in the map as cut into halves by the pike. The height of this crescent is about two feet; the length of it, 269 feet. There is no use assigned to it. The portion north of the pike was covered and protected in 1899 by a growth of small bushes and trees.

The fort wall, on Mr. Ridge's side, the extreme north, runs comparatively straight. The average height of the embankment on Mr. Ridge's land is 13 or 14 feet, and there are fewer gateways on his portion than on any other of equal extent. There is a ditch on the inside for the entire extent.

We dug into the ditch running out from the mound on Mr. Ridge's side, with the following results:

The part dug was near the large mound in his orchard. At a depth of three feet in the bottom, and resting on undisturbed earth, and covered by the accumulations of years, was the bottom of what had once been a very large clay jar. It seems, from the fragment found, to have been at least a foot in diameter. The upper portion being gone, we could not tell the height. Several other fragments were found in this ditch.

On the south side of the Lebanon and Chillicothe pike, just south of mound 69, there starts another ditch or moat. This we carefully excavated, and found a number of interesting things. It has filled to a depth of three feet. This makes the original depth about four feet. There were fragments of charcoal and some burnt stone in it; that was all. We dug another trench about 100 yards further south, in the same moat, and here took out fragments of pottery, as many as one could hold in two hands. As the excavation was enlarged, more and more pottery pieces were found, but they were well scattered. There were fragments

of the bones of a very large animal, presumably those of a buffalo, in the moat, and some flakes of charcoal. There was no burnt earth. A piece of mica, about three inches across, and chips of flint, were also taken from this ditch.

Resting upon the undisturbed earth was a layer of gravel reaching about two feet in width, and six inches thick at thickest part, running out to a feather edge toward each side. We do not know how far it extended along the moat, or why it was placed there. It was put there by the hand of man, as numerous objects, such as referred to above, were found on and in it. The moat here has been filled in by rubbish to the depth of three feet; it is three feet deep now. Its original depth at this point was therefore six feet.

Between stations 417 and 418, there is a place which has either been only slightly excavated, or else filled up again after excavation, as it is only a foot lower than the bank on either side, and has but a few inches of black soil above the yellow clay which is found at a depth of three feet in the other parts of the moat.

We dug in the "causeway" which leads out from station 5, but found that it was original earth (natural), not filled in, and that the elevation was undoubtedly made use of as a foot-way in and out of the inclosure.

After the causeway was examined, pits were sunk in the depression or moat on either side. 20 inches of black, mucky soil intervened and then the natural clay. It appeared to us that here the moats were never very deep. It is possible that the clay may have washed in, but we consider that improbable.

Outside the embankment at station 3 is a large, long moat, briefly described on page 51. Further excavations were made in it at another time and nearer the woods its original depth must have been four or five feet greater than at present — a total of 6 or 7 feet in excess of what it is today.

A hollow into which the ditch extends, rapidly deepens. A terrace follows it for nearly a mile, ending abruptly opposite a peculiar knoll, which may be natural, although

PLATE XVII.

Summer of 1889. View of Outside Slope of Embankment, West Side, Old Fort (near Stations 286-7).

it appears as if artificially rounded. There are also a number of depressions; all of which should be investigated more thoroughly.

It is likely that natives made use of the ditch as a covered retreat when they wished to pass from the mounds, or the parallel walls, or the pavement to the Old Fort and be protected en route. Again, that ditch may carry some ceremonial significance.

The writer is of the opinion that the ditches were more extensive when Fort Ancient was completed and that they bore a peculiar significance to the whole earthwork, a relation which is at present imperfectly understood.

CHAPTER V.

EXCAVATIONS IN AND ABOUT THE EARTHWORKS. STONE GRAVES, STONE HEAPS, ETC., AND THEIR CONTENTS.

Reference has been made to the stone heaps and stone graves so numerous about the Great Gateway and on the terraces. In addition to such, there are seven small mounds on the outside, within a few hundred yards of the fortification, but our map is not large enough to show them, and, besides, they are unimportant. The stone graves and the cemetery were opened very carefully, and drawings and photographs taken of their contents. In the center of the Old Fort in 1889 stood the stump of a large and old walnut tree on a perceptible rise of ground. For a distance of about 110 feet, all around the stump, are many graves, at an average depth of two and a half feet. These graves are formed of limestones, which were brought from the ravines adjacent, or the river valley below, and are placed on each side of the skeletons, at the head and at the feet, and over them. The skeletons found in the cemetery are of an average size, being about five feet six inches in height, and were buried similarly. But one exception of consequence was observed — that of a skeleton surrounded by a circle of stones. The following objects accompanied this interment: Near the left femur was a large spear head of yellow flint; near the left shoulder were remains of pottery broken into small fragments; near the right femur, a large stone celt. The bones of this individual were quite well preserved, and we saved them almost entire. From the grave-yard we took out twenty skeletons in various stages of decomposition. Some of these were as deep below the surface as three feet, and one was four feet.

The stones are about 15 pounds weight on an average. Some are heavier, and others lighter. Between the stones and the body there is usually four inches of earth. It is almost impossible to save anything except the skull in

fragments, the femura, tibiæ, and heavier bones. Some of the larger phalanges and the os calcis are often entire, but the ribs, vertebrae, pelvis, and smaller bones are usually entirely decayed, and frequently no trace of them remains.

In this field (Old Fort) was observed at the time of exploration, some house-sites that have since disappeared. Some were clearly defined, others indistinct. They vary in diameter from 22 to 30 feet and two of the best preserved of them have a depth in the center of three feet. In character they are not unlike a small circus ring. The area inclosed is different in color from that outside. Fire has tinged the earth to a reddish hue, and pottery fragments, ashes and animal bones are to be observed.

Mr. Hughes, an aged man who has lived near the fort all his life, and was able to furnish us with much information as to the change in character of the surface since his boyhood days, states that these circles and depressions were plain fifty years ago. At the time of examination, the writer was led to believe that the large lodges in the South or Old Fort were similar to those built by the Mandan Indians on the Upper Missouri. He is still of the same opinion. If the structures were of that character, when the supports decayed, or the sun-baked clay was affected by frosts, the larger portion of the clay — where it was thickest — in falling would leave an embankment of circular appearance.

THE MOUNDS WITHIN FORT ANCIENT

Four of the mounds in the North Fort appear to have formed a rude square nearly in line with the cardinal points. This coincidence carries no significance, one is led to believe.

Four plates from the original edition of the book "Fort Ancient", describing these mounds and some stone heaps are herewith inserted.

On the east there is a small mound about 100 yards from station 1 and it is covered with burnt stone. About 200 yards south there is another small mound near

the edge of the woods. There are two more equally distant to the north and west, thus making a square which, while not altogether exact, closely approaches it.

Near station 35, across a deep hollow over in a dense woods, are three mounds. They are 300 to 400 yards distant from the nearest approach of the wall. They vary in diameter from 20 to 30 feet, but they are all nearly the same altitude. The average height is three feet. These mounds were dug out very carefully and a few interesting things found. The following account of them is taken directly from the Field Book:

(The numbers used in reference to graves and mounds require a brief explanation. Last year, when doing field work, I began to number consecutively all mounds opened, in order that my notes might not be confused. These numbers were continued this year.)

The first and largest of the three mounds is number 50. It is near a saw-mill, and about one quarter of a mile due south from Mr. George Ridge's house.

The mound is four feet high, about 40 feet in diameter, and quite regular in outline. Work was begun Thursday morning, July 18th.

For a considerable distance in this structure nothing whatever was found, and, indeed, we were well into the center of the mound when we came upon a large mass of burnt clay, and considerable charcoal and ashes. About six inches above the base line was a fine layer of burnt bone; this was two or three inches thick, and extended over half the mound.

Below this, near the center, were two "pockets" covered by burnt stone, and extending two or three feet deep. There were pottery fragments in each of them. Near one of these "pockets" were three sheets of yellow mica, with edges neatly trimmed, and presenting a disk-shaped appearance; they were about six inches in diameter. There was a fragmentary skeleton in the mound, which had one arrow-head and some pottery fragments buried with it. It had on the right hand quite a mass of red ochre, which was probably used for war-paint. Near the south-

west part of the mound a broken celt, and a black stone of rather peculiar form were removed. This latter was a very fine relic and can be restored. The length was about six inches, and the width about one and one-half inches. The pottery found in this mound is thin and well made, but not ornamented. There were no stones in the mound except a few above the bones, and these were not laid regularly.

Mound No. 51 is in the same woods as No. 50, and lies nearly south from No. 50, 200 yards, or about 600 yards from the north point of the fort wall near station 32 or 33. It is two and one-half feet high, and 40 feet across. This mound was dug entirely through, and traces of decayed skeletons were seen, but none of the bones were sufficiently well preserved to take them out entire. There were about 30 scales and chips of flint found with some of these bones.

No 52 is in the same woods, but is nearer the fort wall; it is on the edge of a hollow, probably about 200 yards across from the fort, opposite station 32. It is about 17 feet across and two feet high, and had a circle of stones, somewhat burned, lying immediately under the surface, extending completely around it. This circle was about 15 feet in diameter, and 20 inches wide, and about three layers deep; the stones were not laid with any precision, but rather heaped in. There was nothing whatever within this stone circle. In the same woods, where these mounds are, and on the ravines bordering on this side of the fort, there are numerous stone graves, in which skeletons have been found, and many relics have been picked up in the woods. The first time it is plowed, the find will probably be very remarkable.

The terrace on the east side of the Great Gateway has on its surface many stone graves. We opened one or two of these and found some very interesting remains. We here give a few notes from the Field Book as taken on the spot, and upon the same day the finds were made.

The stones in this pile covered an extent of 20 feet by 80, the stone running from 15 to 25 inches in height, and

PLATE XVIII.
End of Embankment at Sta. 230, Old Fort. 1889 summer view.

the quantity in the pile is not far from 460 wagon loads. The graves are near the Great Gateway, and are on the east side next to the hollow near station 104, and are on the outside of the wall. There they are on a terrace of 25 feet width; this terrace is about 19 feet from the top of the wall above. We commenced on the west side of the terrace, and dug out a space about 20 feet wide, which was carried right through the stone grave. We then passed over several places where others had dug, and took out 15 feet of grave in one part, and 10 feet in another at the other extremity of the terrace.

There were decayed bones scattered all through this stone pile, and pottery fragments in large numbers. These were under the first layer of stone, and very much decayed. They were not over 10 inches deep, most of them, but the larger and better preserved bones were about two feet deep. From the number of bones found, there must have been 18 or 20 individuals interred at this place. Some of the pottery found was decorated, but most of it was plain. In one mass of bones was a very fine celt seven inches long, by four inches wide. In another place was a limestone of about 20 pounds weight, that had three cup-shaped depressions on one side, and three deep grooves on the other, as if it had been used for sharpening a tool of some description; the grooves look as if copper had been sharpened. The cup-shaped depressions were probably due to the grinding of paint. No animal bones were found in this stone pile, but several very fine knifes made of long curved flint flakes were found. These skeletons had stones heaped over them, not laid regularly. The bones were broken in small fragments, about two bushels in quantity. The bones were found in pieces not longer than six inches, and most of them less than four inches.

There is a large stone grave at the southern extremity of the fortification, just outside of the fort wall. The grave lies on a high terrace far above the river, and only 36 feet from the fort wall. The grave holds about 40 wagon loads of stone, which are heaped up and not laid in any regular order. Under these

stones we found fragmentary bones, broken celts, and many flint chips. The bones, like those found in nearly all of the stone heaps, are very much decayed, and very fragmentary.

The terraces on the west side of the old fort, which overlooks the river, have scattered graves on them, some of which, when opened, yielded very interesting bones and relics; many of them, however, have nothing under the stone save broken and decayed bones. The river flows at the foot of the hill on this west side for some distance, and there are many points on the embankment where the descent to the river is very steep; an angle of 30 degrees, and where one could stand and shoot an arrow without difficulty across the stream. These terraces do not have graves their entire length, but only in certain places.

The following account concerning these graves, and copied from the Field Book, may be of some interest to readers:—Four of them were opened, situated on the terrace next to the top, or the third one, going from the river up. Two of the graves opened were located together, and may, perhaps, with propriety be classed as one large tomb. The stone contained in this grave would be equal in quantity to about 100 wagon loads, and is about two feet thick, spreading over a space the width of the terrace—20 feet—and was about fifty feet long. We threw out all this stone, which occupied the time of three men for two days, and under it we found a total of nearly 20 fragmentary skeletons. The skulls were crushed, and the jaws in most instances were broken, but such jaws as were saved we judged to represent individuals of average size, and quite strong. The teeth were much worn, as if they had eaten little vegetables, and their sustenance had been mainly derived from the flesh of animals. The bones that we did save entire, of the legs and arms, would indicate a people of about the same height with ourselves, but rather stronger.

There were the bones of children found in this stone heap, and, judging from the teeth of one, we should say it was about seven years of age. There were some inter-

PLATE XIX.

Giant Embankment at Entrance. Southern Part of Old Fort. Near View, Camera pointing Southwest.

esting relics, such as a clay dish, nearly entire, and about five inches high; a beautiful ornament or personal pendant some four inches long, made of black slate, with a hole drilled through it; several arrow-heads; and a stone celt of unusual finish and beautiful shape. There were no bones of animals in this stone heap.

The other two graves were situated further north, one on the center terrace, and a third on the upper terrace. These contained numerous fragments of skeletons, but nothing of any interest in the way of relics, save a few small beads, one or two arrow-heads, one spear-head, and a few pottery sherds.

The earth wall along the west side is quite high in some places, higher than on the east side of the old fort. The ditch is quite deep here, and will average three feet below the level inside. The embankment in many places has a layer of stone underneath, presumably to keep it from slipping and sliding down the hill. Landslides in limestone regions being not uncommon, the natives took precautions against the danger here at Fort Ancient. However, some consider the stones of very slight protection or support in case the wall should become loosened in an excessively wet season, and start sliding into the deep ravines. The stones can be seen cropping out at the base of the wall in every gateway. Near station 248, on a point overlooking the valley, is a small grave containing about two wagon loads of stone. Yet underneath were three skeletons in fair state of preservation. With the skull of one individual was found a large flint spear-head, and with another several shell beads, a small but finely made arrow-head, and some ocean shells, which had been perforated and worn as ornaments. These bodies lay about 10 or 12 inches beneath the surface of the ground, with scarcely any covering. In most instances the bones in the graves in the woods and on the terraces are found within a foot of the surface.

PLATE XX.

The Middle Fort (Isthmus), looking West.

CHAPTER VI.

VILLAGE SITE ALONG THE BANKS OF THE LITTLE MIAMI RIVER.

A preliminary examination was made of this in 1887 and 1888. In 1889 more extensive excavations were undertaken and a number of men employed for a considerable time. The village extends over a space of ground, possibly half a mile long and 400 yards in width. Most of the explorations were confined to a space 100 feet by 400 feet. It is stated that in the heavy woods on the flat across the river is another site, but the writer never attempted explorations on the west side of the river. As the river each spring washes and cuts into the banks, a thick hedge has been planted about twenty feet back from the edge. The bank in 1889 was perhaps 15 feet in altitude and nearly perpendicular. We were requested not to dig on the river side of this hedge, and therefore confined all our excavations to the east side of it. The first large excavation made was back from the hedge about 30 feet. At a depth of two feet we found numerous bones of animals, ashes, and pottery fragments. The soil at this point is a heavy black loam with some sand in it. It is very rich, and raises annually splendid crops without fertilization. The bones taken out from the depth of two feet were mostly in small pieces, and they were not nearly so numerous as those which we found at a depth of four feet. Four feet of earth has accumulated since the great village was there. It is at this deep level that we find pottery of a beautiful texture and finish, and implements of a better grade than those found at the two-foot level.

In these excavations the same order of arrangement is noticed every-where. First, there is a layer of loam about two feet thick; then there is a thin deposit of ashes, charcoal, etc. Then there are two feet to thirty inches of sand and loam, and the heavy deposit of refuse. At five feet we find, in places, a thick layer of bones, pottery, etc.; it is not,

PLATE XXI.

View of the Valley. From Tichenor's "Guide to Ft. Ancient."

however, continuous like the four-foot layer, and the village that left it was not so large as the two later ones. In some excavations the bones are few, and the mussel shells scarce. In others we seem to strike the site of a lodge and find many remains of occupation.

A few pieces of pottery of a dark red color, which were thick and clumsy, and a few bird bones were all that were found at two feet from the surface. From a depth of two feet until we had reached a depth of four feet we found nothing. At four feet we found the greatest deposit of objects described. This fact indicates that a very considerable length of time had elapsed since the first village was abandoned before the next one was occupied. At this level we found a large black mass of ashes, and soft earth, and burnt stone; such as would result from long continued cooking on one spot of ground. In this mass of ashes were the bones of 17 animals and birds, and many fish scales. We also took out eight bone needles or awls, such as the women of the tribe would use in the manufacture of garments of deer skin. Some of the pottery fragments found at this level were quite large and nicely decorated. The bones represent the following animals and birds: bear, deer, elk, musk-rat, ground-hog, raccoon, squirrel, rabbit and wolf, wild turkey, wild duck, hawk, owl, quail, cat-fish, turtle, and gar.

It is well known that ashes have a wonderful preserving quality and in the deeper pits minute fish scales and bones and the vertebral column of fish were removed in almost perfect condition. Needles, perforators and awls were quite common as were mussel shells used as scrapers and as hoes. Typical perforated mussel shell for the insertion of either a finger or stick is shown in Plate XXVI. Some of the awls may be seen in Plate XXV.

A number of children's graves were uncovered but no group of graves was discovered during the explorations in the summer of 1889. A child, probably two years of age, had been buried with unusual care. The stones were two feet by six inches, three inches thick and weighed about 75 pounds each—the largest that we found either in the valley or upon the hill. Near the head of the skeleton lay four shell discs, two small shell pendants and an arrow point of clear chalcedony. Since the grave was constructed, natives had camped on the spot above, for there was an ash pit 4 by 3 feet which contained much bone material and pottery sherds.

After the writer's appointment as assistant under Professor Putnam, work was undertaken again at Fort Ancient.[1] In "Primitive Man in Ohio" the results of the 1891 exploration were given to the public in Chapters VII and VIII of that work, and about half of the pages relating to Fort Ancient are republished herewith.

When we consider the magnitude of the walls of Fort Ancient, the immense amount of labor involved in their erection, and in the construction of the miles of terraces connected with them, we realize that all this required a long period of time or a large number of workers; perhaps, when we bear in mind the primitive methods of the builders, we are even justified in believing that it represents the prolonged and continuous industry of a numerous population. Taking this view of the case, it is a surprising feature to note that so few mounds occur in connection with this

[1] When he was appointed to the position of field assistant for the World's Columbian Exposition Survey in 1891, Professor Putnam wrote him on March 18th of that year, giving instructions for the work to be carried out at Fort Ancient, viz.: "Taking into consideration the fact that the Exposition will have the benefit of your former work at this place, and the use of such plans and notes as you already have, I herewith agree that all material obtained during this expedition shall be at your service for study and description."

PLATE XXII.
The Lowest Point in Fort Ancient's Walls. Middle Fort, West Side. (1889.)

great earthwork, and that even such as do exist are of insignificant proportions. Omitting a few small elevations which have been plowed over until it is impossible to determine whether they are natural or artificial, and which have never disclosed anything that would throw light on the question, there are only ten mounds in sight from any portion of the enclosure; all these except one,[2] which is in the loop or curve formed by the junction of the parallels, at the farthest extremity of the fort, were thoroughly examined.

As the survey of 1889 was not able to thoroughly explore the village sites, under Professor Putnam's direction the author employed eight or ten men for some weeks in May and June, 1891, on the "Lower" and "Upper" sites. These are separated by a small ravine, merely, although the cemeteries were about 700 feet apart. The Lower one—south—was where we had dug in 1889.

One can observe both sites from a hundred places upon the towering fort walls above. It is so near the enclosure that but three or four minutes would be occupied in reaching safety should the villagers be compelled to flee at the approach of an enemy.

Besides the site mentioned, one mile and a half below the southern extremity of Fort Ancient is another large village covering some eight or ten acres rich in graves and debris. At the mouth of Caesar Creek, six miles distant to the north, are two extensive sites, one in the bottoms and the other upon the hills to the south.

The 1891 work confirmed what had been observed three years previously. For a depth of two feet there was little indication of occupation. This level was the highest, and therefore

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[2] This was examined in April, 1891. It contained nothing.

PLATE XXIII.

Washout in Wall. West Side of New Fort, near Sta. 363. Summer of 1889.

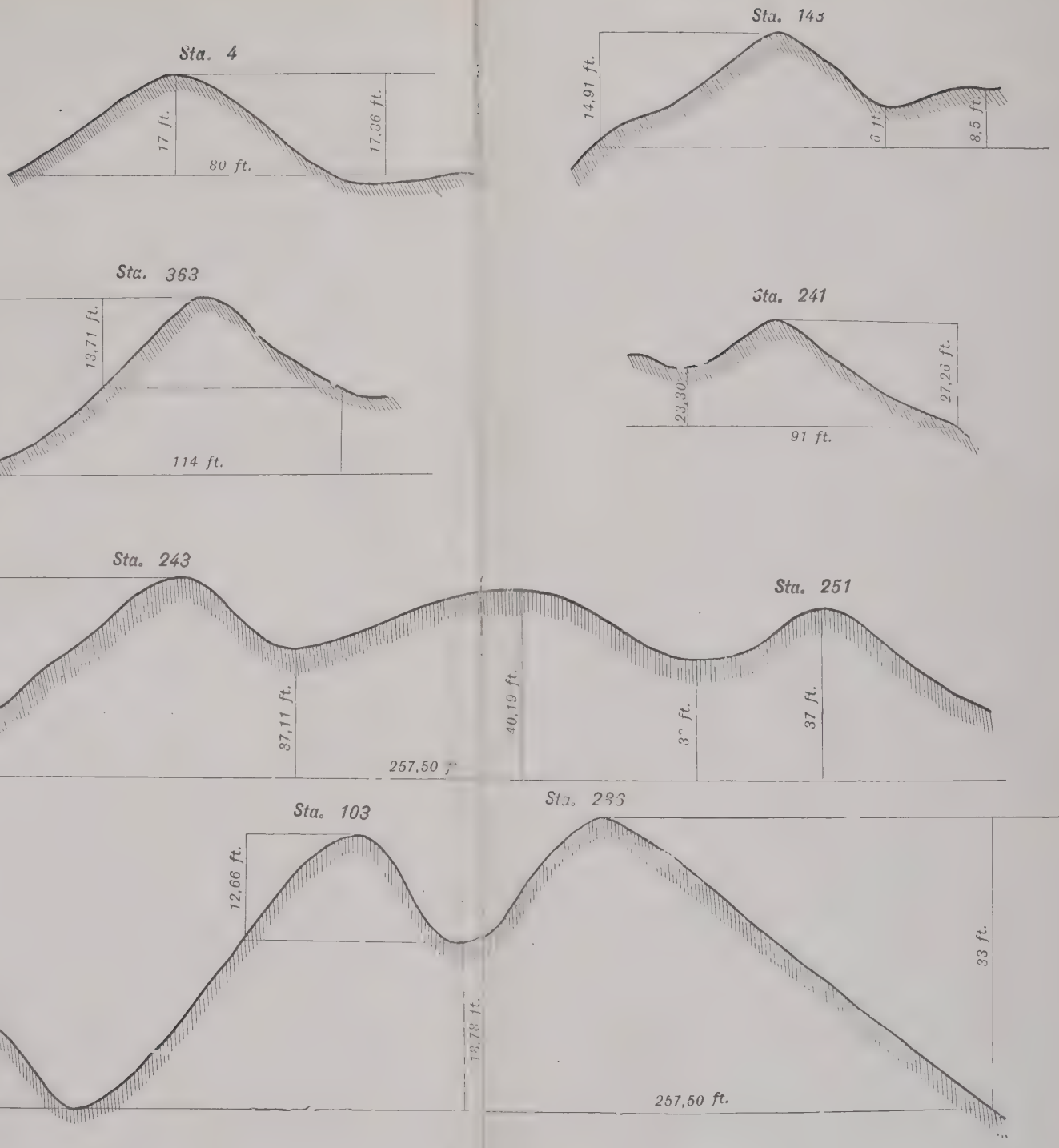


PLATE XXIV.

Cross Sections of the Embankments, taken where Contrasts were Marked.

the latest, of three villages that had been situated upon the bottom. We found great quantities of burnt stone, ashes, charcoal, fragments of pottery, bones of animals and birds. Implements of stone lay scattered about and were, with few exceptions, broken or thrown aside in the waste so abundant in such places. This layer had a thickness of about six inches. After passing through it we found another stratum of soil not less than a foot thick, and in some places as much as eighteen inches. It did not contain any specimens of human handiwork. At a depth of one foot below the first layer the level of the second village site was discovered. It had been occupied for a longer period of time than the other.

A few inches of clean earth had formed between the second layer and the debris of the lowest or oldest site. Its highest point is fully five and a half feet below the present surface. The depth of this layer is less than six inches.

The greatest depth below the surface at which any relic was found in the three village sites was six and a half feet. The specimen was a small highly polished celt of green stone.

It must not be inferred that the "kitchen-middens" extended in a continuous, unbroken stratum at the various levels. In some of the pits we found all three strata, in others either one or two. A few places were entirely without layers and did not show any traces of fire from the surface to the bottom of the pit. Articles of aboriginal manufacture were also absent.

It is obvious then, that at three different periods in the past, separated from one another by considerable intervals, this bottom was a place of resort for the aboriginal hunters and fishermen of the Little Miami valley. But whether they came to spend the summer only, or whether the villages were permanent places of abode will never be known. On one hand is the great amount of refuse accumulated; but on the other is the fact that the ground is subject to an occasional overflow. At any rate, the intervening strata of earth containing no evidence of human residence, would show that, whichever view of the matter we take, occupation of the site was not continuous.

During the excavations at this point we unearthed three skeletons some rods back from the river. The first was that of an adult of small size, not more than five feet six inches long. This burial is noticeable for its peculiarity. The earth had been removed for a depth of two feet, and in the bottom of the space a hole had been dug large enough to contain the body. At each end of this hole a rectangular limestone slab had been placed to serve as head and foot stones. The body had then been deposited and four large flat limestones placed across with their ends resting on the earth at either side so they would not touch the body. The soil had then been thrown over the structure. The bones were well preserved, but no relics of any sort were found in the grave.

Within three feet of the end of the grave just referred to was one containing the remains of a child. It was similar in construction to the first, except

that the headstone was omitted, and only two stones placed over it. A small quantity of unusually fine, soft black earth was with the bones — possibly the remains of garments or robes in which the child had been wrapped.

PLATE XXV.

Bone Awls and Scrapers, from Ash-pits, Fort Ancient.

CHAPTER VII.

GROUPS OF GRAVES.

In addition to the scattered graves found here and there under or in the village site, several small cemeteries of three to seventeen graves each, were uncovered. Most of them occurred in the Upper site and were more carefully constructed and different from those of the Old Fort.

It is interesting to compare the Fort Ancient graves with those of Kentucky and Tennessee where large cemeteries exist. The graves found at Hopkinsville, Kentucky, in 1903 (see Bulletin No. 3, Department Archaeology, Phillips Academy, p. 115), were more nearly, in point of construction, like those of Fort Ancient than the ones described by Gen. Thruston in his "Antiquities of Tennessee."

PLATE XXVI.
Typical mussel shell Hoe; Village Site; Full size.

General Thruston says:

"The rude cists, or box-shaped coffins, are made of thin slabs of stone. Sometimes the stones are broken or cut, or rubbed down so as to fit evenly and form a well shaped case, but more frequently they are rudely joined together. Occasionally they are found in mounds or layers, four or five tiers of graves deep. The graves are usually six or seven feet long, a foot and a half to two feet wide, and eighteen inches deep; but graves of greatly varying sizes and shapes are found intermingled with those of more regular form. The children's graves are proportionately smaller. Frequently the same cist contains two or three skeletons, and is not more than three or four feet long, the bones having been placed in a pile irregularly within it, indicating that they were probably interred long after death, and after some intermediate preparation or ceremonies similar to the burial customs of some of the historic tribes.

"Many of the graves in the vicinity of Nashville are lined with large, thick fragments of broken pottery, as neatly joined together as if moulded for the purpose. The author recently excavated several graves of this kind on Hon. W. F. Cooper's farm, near Nashville. The pottery burial cases were symmetrically formed, and seemed to be moulded in single pieces, until an attempt was made to raise them, when they fell apart, and were found to be composed of neatly joined fragments of large vessels; the heavy rims of the vessels, more than an inch and a half thick, having been used as rims or borders for the burial cases.

"Nearly all the stone graves are found to be filled with earth inside, by infiltration. The roots of trees have penetrated them. The very skulls are usually packed solid with earth, but now and then the iron pick will strike a hollow cist in its original state, and the fortunate explorer may be rewarded by finding a vessel or bowl of clay, perhaps

two or three, within easy grasp, beside the still uncovered skeleton, and he will thus secure a better opportunity of observing at his leisure all the interesting details of the burial.

"Sometimes a little cluster of stone graves is found, with the usual accompaniments of pottery and rude ornaments, like many modern plantation burial-places, containing the remains of a single family, or group of families, that doubtless lived an agricultural life in its own farm dwellings. The remains sometimes found in these small isolated burial-grounds show that some of these villagers or country people must have been supplied with many of the domestic conveniences enjoyed by the inhabitants of the larger towns."

The burials in both upper and lower village sites were about equally divided as to adults and children, save in one or two instances. No objects were buried with the adults, but near the children were bead necklaces, small shell ornaments, and shell toys. Frequently a child would be placed alongside an adult woman, probably its mother. Occasionally the short grave of the child, but three or four feet in length, rested directly upon the long hollow vault in which lay the mother. But one or two male skeletons were found in the group of graves and those were young persons, not over eighteen or twenty years of age.

The lower burial site when uncovered presented a very singular appearance. We had excavated a great hole one hundred feet in length and forty feet in width to a depth of four feet, or until we struck hard river sand. Above this floor stood the graves from one to eighteen inches high. See Illustration

XXX. The deeper graves were often in the undisturbed river sand, and more carefully constructed ones were probably hollow, but had partially filled with earth, because the stones across the top were broken by horses or other weighty animals passing over them.[1]

The illustration shows some of the stones sloping toward the centre of the grave, thus permitting the water and earth to penetrate to the cavity beneath.

Upon a given day the 16 graves, comprising the lower group, were opened in the presence of a large number of people from Columbus, Cincinnati, and surrounding country. In those graves which were covered by perfect stones the skeletons remained well preserved. Out of thirty-seven graves in the three groups we secured twenty-five crania entire. All of these crania, together with village site material, were shipped to Chicago to be exhibited at the World's Columbian Exposition.

AGE OF THE VILLAGE SITE

The conclusions set forth after the two explorations mentioned, vary in detail, but agree in the main. The writer wishes to place on record the observations of that time, with a few unimportant changes. It must be remembered that there is no evidence that the Shawanoes camped for any length of time near Fort Ancient. Their large village, Old Chillicothe, was three miles north of Xenia or 25 miles from Fort Ancient. No glass beads or iron tomahawks or copper kettles have been found in the burials about Oregonia or Fort Ancient. The three villages seem to have been in existence before the advent of French or English traders. Mr. Hughes, previously quoted, who came to Ohio at the age of fourteen in 1812, affirms that the site along the river was covered with a heavy growth of scyamore, elm, walnut and oak timber. This testimony is presented for what it is worth.

At Oregonia 100 or more stone graves were opened for Professor Putnam. Graves were upon the hill summit and also in a mound of some size. This mound was more nearly like those found in Tennessee and described by Gen. Thruston, (while speaking of a certain mound he refers

[1] It must be borne in mind that the tops of the graves were sometimes within twenty inches of the surface.

to stone graves): "A hundred or more of these rude sarcophagi are occasionally found deposited in several tiers, or layers, in a single burial mound."

This statement is borne out in the Ohio valley by our own investigations, as well as those of others. While not at liberty to speak in detail of the work done by the World's Fair at Oregonia, Ohio, a few general remarks will be permitted regarding a mound of unusual character. Cæsar's Creek, a tributary of the Little Miami River, is noted for the large number of mounds existing near its banks. No archæological work was ever carried on in Cæsar's Creek valley prior to 1891. Hence, the field was unusually rich. Upon the heights overlooking the creek and the Miami River to the south is a large village site, covering sixty or seventy acres of ground. In the bottoms on the south side of the river, below the mouth of the creek, is another large village site, while just above the delta is still a third, and smaller one. At the edge of the village upon the hill is a gravel knoll, from which we exhumed ten skeletons, two whole pots, etc. As is always the case when interments are made in gravel or sand, the bones were remarkably well preserved. Just back of the gravel pit is a mound eight feet in altitude and one hundred and ten feet in length. In the mound were seventy-nine skeletons, twenty of which were enclosed in stone cists, such as we find at Fort Ancient. Two of the vaults were hollow, the others being filled with loose earth which had settled in through the crevices. In many places in the mound there were three or four

layers of graves, one on top of each other. The skeletons resting upon the base line were not incased in stones. Upon the extreme southern edge of the mound were five graves in a row, all heading the same way, and some of them containing two or three skeletons each. A flint

PLATE XXVIII.

Restored Ft. Ancient type of Pottery. 1-3 size.

dagger of fine workmanship, made of chert, double-pointed, and fourteen and one eighth inches in length, lay by the right femur of one of the largest skeletons buried in the tumulus. By the side of one of his neighbors were a pair of antelope horns. This is exceedingly interesting, as we have no historical record of the presence of antelope in

the Ohio valley, although we do know that both elk and bison were here. The horns have been either transported from the West, through traffic with other tribes, or the burial was made at a greater period of antiquity than we would assign it.

It is interesting to note the varied methods of burial of these seventy-nine skeletons. Some lay extended, others with knees drawn up against the sternum, and others lay upon their sides. The people making the interment frequently placed the head and trunk of the person in one position, and the legs and arms in another place two or three feet distant.

When the aborigines dug graves in the Old Fort, the burials had to lie on tough blue glacial clay, and because of the formation water was retained and the bones decayed rapidly. Bones in sandy or gravelly soil are more apt to be well preserved. The decayed condition of bones in the Old Fort graves does not necessarily mean that they are older than the valley interments, although the writer is confident that they are older. Both sites seem to be related. It is probable that less time and care were taken in constructing burials on the hill. Interments may have occurred after a fight and therefore would be hastily made.

In attempting to estimate the age of the village site in the valley, several things must be considered. There are five feet of earth above the lowest site of village deposit. This may have formed in a short period of time, or it may have been five hundred years in forming. When the river is very high, it overflows the bottoms in which the village was located, and frequently deposits mud or sand in a field. It also takes away sand and mud quite as frequently as it leaves it. One bank of the river during a flood may be built up while the other is torn down. But it is very sel-

dom the river gets high enough to flood this bottom to any considerable depth.

But there were hardly as many floods in the river in early days as now. The same amount of water fell, probably more, but the land was not cleared, and the streams would not discharge their contents so rapidly into the river. Now we have low water in summer, and a flood every spring. Old settlers can remember when the river was lined with heavy timber, and when there were numerous swamps along the bottom lands; and they tell us that the river contained an even stage of water from year to year; that the streams during the winter held much water, but were seldom more than bank full. Trees, logs, and brush, accumulating in the stream, tended to check the flow of the current; the roots of large trees extending down into the water's edge would hold drift and thus form dams. The fact is attested by this: Eighty years ago there were saw-mills on streams now so small they would not turn the least water-wheel. The writer has heard his grandfather and grandmother (who came to Ohio in early days by canal-boat, long before railroads were invented) speak of creeks in the neighborhood of their old home, that once furnished water enough to turn the wheels of several large mills. These same streams now are dry through the summer, but they get very high in the winter and spring.

Now the point is this: The earth over the second or later village site has been deposited by floods during the last hundred years, or since the land has been cleared. The earth (three feet) above the first or lowest village site, and below the later village, has been much longer in depositing, as floods then seldom covered the bottoms for reasons given above. This lower layer is composed chiefly of decayed vegetation, and might accumulate at the rate of one inch in six years, which would give the age of the lowest layer 216 years previous to the upper one, or 316 years ago: *i. e.*, 1570 to 1575. However, these figures can not be said to be accurate, and we give them as result of

PLATE XXVII.

Fragments of Decorated Pottery, Lower Village Site, Fort Ancient. One-half size.

deliberation after what we uncovered during the course of explorations. Persons who have spent a few days at Fort Ancient, or, as in the case of most observers, a single day, are not qualified to pass upon the problems of age and origin. The Serpent Mound is of such character that it can be seen thoroughly in a few hours. Fort Ancient is so intricate that weeks of study are necessary before one is possessed of anything like complete information concerning it.

PLATE XXIX.

View of the Two Mounds just outside the New Fort. The Parallel Walls Start between these. The Camera is pointed East; Mounds 250 ft. Distant.

CHAPTER VIII

THE PARALLEL WALLS AND MOUNDS. THE PAVEMENT AND DITCHES. IMPLEMENTS AND ORNAMENTS FROM THE SURFACE.

Just without the walls of Fort Ancient, on either side of the pike, are two good-sized mounds. They are shown in Plate XXIX, page 116. Mr. George Ridge's house is hidden by thick foliage beyond.

When one ponders upon the field work done in the past at Fort Ancient, one is led to conclude that these two tumuli played no small part in Fort Ancient's history. Not only do the parallel walls begin at these mounds, but also the pavement — which has never satisfactorily been explained—also three or four ditches or moats. Atwater seems to have been impressed by the latter—for they were clearly defined in his day. It is difficult to trace the ditches at the present time, and both mounds that lie at the head of these ditches, have been somewhat injured by the state road running between, but, from a careful examination of the mounds, we are led to believe that the edges at the base once came within 60 feet of each other.

Both of these mounds have been opened and their contents carefully inspected by Mr. Fowke. The mounds are 75 feet apart, on each side of the pike, and the distance from station 2 to the large mound on the right is 375 feet. The large mound is No. 69; the one to the left, No. 68. The latter was opened first. For many years it was thought that within these structures the builders had placed offerings to the dead, and a number of skeletons. So the opening of them was looked forward to with not a little expectation by persons residing in the neighborhood of Fort Ancient. But all were doomed to disappointment. The following, taken from my field note book, gives a concise account of the work done in No. 68.

This mound is 10 feet in height, and has a diameter at the base of 80 feet. We began operations on the south side, and ran a wide trench, fully one half as wide as the mound, through for a distance of 40 feet, or until we reached the old diameter on the north. (The old diameter was 40 feet; the mound has been cultivated, and has washed badly, so that it is now 80 feet wide at base. The portion that has accumulated from wash and decay would, of course have nothing in it.)

The mound was found to consist of two kinds of earth—a dark loam and a yellow clay. The clay was piled up first, and then the loam was heaped upon this. The mass of clay is heaviest on the west side; the loam thickest on the east side, thus making the mound symmetrical. At the base line there is a layer, four inches in thickness, of heavy black soil. The remarkable feature connected with this black soil is that *it has a very offensive odor.* In over 70 mounds and graves opened during the last two years the writer never before met with such an instance.

Continuing a trench north-east from this mound, the same soil and odor were encountered fully five feet deep. While it is like that arising from decayed flesh, yet it must result from decomposition of vegetable matter. No satisfactory explanation could be obtained. The odor penetrated for some distance and continued during the exploration; was pronounced and caused the workmen inconvenience.

Nothing of consequence was found in the structure—just a few decayed bones (animal) and fragments of finely finished pottery. The mound was not of burial type, and its true significance must remain, for the present, a mystery.

The conclusion drawn from this mound is, that it was built at two periods, that it was "lop-sided" or ill shaped at first, and righted when built upon again. What length of time intervened between the commencement and the completion can not, of course, be determined, but, probably, not much, as there is no line such as would result from

decayed vegetable matter between the first and second earth masses.

Mound No. 69:

This one is just across the road from No. 68, and is 12 feet in height, having a diameter at the base of 80 feet. It has not been injured to any great extent by plowing. There is a large elm tree standing near the center and a little to the west, which has served as a protection to the soil.

In Plate XXIX, we are looking toward the East, both structures appearing as they did before exploration. Timothy and flowers grow in profusion and almost hide the larger tumulus.

In the exploration, which occupied nearly a week, pottery fragments were discovered, but no burials and no ash pits or other objects of interest came to light.

THE PARALLEL WALLS

Running due north-east from these two mounds are two parallel roads or embankments about a foot in height and twelve feet wide. These run for a distance of 2760 feet, and terminate by inclosing a small mound about three feet high. In 1901 we explored this and found nothing. These parallel embankments have been almost entirely destroyed by being cultivated for many years; they are only visible where fences run over them, or where a road crosses. They are 130 feet apart.

In 1820, when Atwater surveyed the fort, these parallel walls were very plain. We traced and measured them, however, with as much pains-taking fidelity as possible — as we are persuaded that the next survey of Fort Ancient, if made as long after ours as this is distant from that of Squier and Davis, will find that every vestige of the walls has disappeared. There is nothing between them except the stone pavement, which extends for a short distance. There is nothing peculiar about their construc-

PLATE XXX.
Group of Graves from a Cemetery near the River.

tion, there being no stone in them. In places the walls appear to have been burnt until the ground is very red.

Where the two mounds are (at the western extremity of these parallel walls), there begins a most remarkable stone structure of aboriginal workmanship. This stone pavement is the most interesting part of Fort Ancient. The following description is taken from my note-book, and was made while we uncovered the stones, and examined this wonderful relic of departed ages.

THE PAVEMENT.

Thursday afternoon, September 12th, we took our force and went into Mr. Ridge's house-yard, to seek the stone pavement, of whose existence we had heard from various sources, but which none of us had ever seen. Some of our party were skeptical touching the matter, others were persuaded that something there was, and were inclined to test the truthfulness or falsity of the reports. An excavation four feet in width and ten feet long was made, and one portion of the pavement was actually laid bare. We found at a depth of twelve inches a considerable quantity of fine gravel, which had been filled in between the stones, and which seems to have been intended to secure evenness of surface. The pavement is laid with limestones, which were probably brought from the ravines and creek-beds in the neighborhood. The stones average a foot in length and six inches in width. Some of them are larger, and others of less dimensions. Some of them are about two or two and a half inches in thickness, others not more than an inch and a half. The pavement rests on the original surface, the clay being 14 to 15 inches below it. It is supposed to have been on the surface, of course, and the earth above is due to vegetable decay and the accumulation of debris. Some of the stones give evidence of having been subjected to the action of fire, but most of them show no trace of heat. The use of this pavement is wholly conjectural. We venture the opinion, however, that it does not imply any great ceremonial or religious purpose, but was designed as a place of amusement, or of assembly for the

PLATE XXXI.

A View of the Serpentine Embankment, New Fort.

A 20 ft. Scaffold was Built by Mr. Williams in Order that this Picture might be Taken.

natives. It would always remain dry, while the surrounding ground might be wet and muddy.

Its area, approximately, is 130 by 500 feet; large enough to accomodate hundreds of persons. The natives may have held dances on this platform, and the mounds, being near the parallel walls of the way, would afford an excellent position for on-lookers, and for the squaws, who would beat tom-toms, and accompany the dance with their usual doleful singing. Or, it may have been used for the practice of games and athletic exercises, such as are common to the race. This much, at least, we may safely affirm: that the pavement is artificial, and that it is of great archæological value; perhaps of no great ceremonial significance, but still one of the most interesting features connected with Fort Ancient. We believe this is the only instance of ancient pavement proven beyond a doubt in the Mississippi valley. There are many other places where there is stone in connection with aboriginal structures, but there is no place where these assume the shape of a regularly laid pavement. The plow has greatly disturbed in a number of places a few of these stones, but most of them are as they were placed at first. They seem to have been slightly worn on the upper side, as if they had been used for many years as an assembly-ground.

The earth, which has accumulated over them, would give them an age of several hundred years at least. Of course, these stones once lay upon the surface, there could be no object in covering them up. They must, therefore, have been covered by time alone. The earth in a forest accumulates rather slowly, and, allowing ample margin for any error, we are safe in saying that several hundred years have rolled by since the pavement was used. We would place the date about the year 1400 or 1430. This is, of course, merely conjectural.

We find no evidence in any other portion of Fort Ancient, that a pavement has existed. We find a great deal of stone work here and there, but we think this is the only place where there was an "assembly floor" built by the aborigines.

PLATE XXXII.

Decorated Pottery from the Village Sites.

Mr. Hughes says that fifty-five years ago, when he first saw the pavement, there was as much earth accumulated over it as there is at the present time.

SURFACE FINDS.

There are several places within the fort-walls and in the immediate vicinity, where there is evidence on the surface that a great many flint implements have been chipped and made. The place where these chippings are most abundant, is on Mr. Ridge's farm, about 200 yards from the fort wall (station 0), north-east. From the two mounds at this point runs a ditch north-west, and from this ditch, for the space of 100 yards north-east, we find many flint flakes, cores, etc. There is no flint found in the neighborhood of Fort Ancient, and so the flint flakes and disks must have been brought from a distance. We find a great deal of broken flint of the variety found in the quarries on Flint Ridge, in Licking county, Ohio We also find a great deal of dark gray, or nearly black flint, which has been brought here from some locality foreign to Ohio. It seems probable that the residents of Fort Ancient, considering they did not have implements enough in case of a siege, kept stores of raw material, such as could be worked up into a desired shape at short notice.

A great many large flint disks or blocks have been found in the field north of the fort. These disks and blocks are frequently large enough to make several large spear-heads, say six inches in length. Or, if the blocks were broken up, they would furnish sufficient material for the manufacture of forty or fifty arrow-heads. These blocks have been worked out roughly in Indiana, or at Flint Ridge in this state, and transported to Fort Ancient in large quantities. The flint was not brought in rough pieces, as when freshly broken from the ledges. It was worked down partially until it had a regular outline. These worked objects are usually over six inches in length, and weigh from one to four pounds. We call them blocks when not round, when of a circular appearance they are named disks.

PLATE XXXIII.
Axe, Unfinished Pipe and Celts from Old Fort. Surface Finds.

There have been several quartz arrow-heads found in the surrounding fields, which would indicate that the people here had communication with southern tribes, or that southern Indians passed through this region. But perhaps the quartz was obtained by trading with these natives from the south, although it is possible that some southern tribe visited the Fort.

It is affirmed by farmers that in the past many more objects such as projectile points, axes, pestles, hammers, discs and ornaments were found than at present. Students from Lebanon, collectors and tourists—and they came by the score each month during summer and autumn — have searched the fields every season. The Israel Harris collection, formerly in Waynesville and now in the Smithsonian Institution, private exhibits in Lebanon and other cities contain large numbers of Fort Ancient material. All of this tends to indicate a considerable population at one time, or a smaller number of aborigines during generations. The historic Shawanoe sites in Ohio yield a dearth of surface-found objects compared with Fort Ancient.

I suppose that nearly fifty thousand specimens have been taken away in the past century. Counting the objects in museums, those dug up or found by the surveys, numbers carried away by visitors, some that have gone abroad, and the thousands that are in the hands of private collectors, in the immediate neighborhood of the structure, this seems to be no exaggeration.

The problematical forms shown in Plate XXXIV, page 128, present a variety of shapes. At the top are two sandstone objects (all these are shown about two-fifths natural size), which have grooves and depressions. The one to the left has depressions that resemble finger-marks; the one to the right as if a tool of copper had been sharpened upon its surface. These were found in the Old Fort.

No. 807 was found in 1884, and is a heart-shaped ornamen of red slate. It is finely finished, polished, and worked quite thin.

To the right of the heart-shaped object is an ornament of banded slate, having two perforations. This was found in a grave by a farmer residing near the walls of the fort.

PLATE XXXIV.
Problematical Objects, Tubes and Ornaments. Surface Finds. Old Fort and Middle Fort.

The plumb-shaped object next to it, is of blue slate, has a groove cut around the upper portion, as if it may have been used for suspension around the neck, similar to an ornament.

Lying elevated on two stones are two tubes or hollow cylinders of slate well bored and presenting a symmetrical appearance. They were found in the New Fort.

No. 799 is a paint cup of soapstone found in a grave in 1884.

To the right is a small discoidal of white limestone. Several of these discoidal stones have been found near the Fort, and one or two large ones are owned by a gentleman in Lebanon, O.

Nos. 905, 881, and 897 are all black or banded slate ornaments of superior finish and large size. There seems to be quite a number of objects of this class found within the walls, and it is a noteworthy fact that they are always of superior workmanship, seldom broken, and occasionally unfinished. In any large museum collection the percentage of broken problematical forms is larger than of perfect forms. The Fort Ancient types are therefore peculiar.

Plates XXXV and XXXVI portray the finest problematical stone ever found at Fort Ancient. The material is black slate, very hard and quite close grained. There are two grooves on the face and back of this object. One runs from the top down about an inch and one-half, the other runs straight across. In the angles formed by these two grooves are two perforations extending through the stone and drilled from each side. At the bottom is an oval-shaped hole on the face extending through. This latter perforation does not exhibit the oval shape from the rear, but presents a round appearance. Around this oval-shaped depression are 14 holes, each drilled about one-eighth of an inch deep. They present the form of an arrow-head, or of a heart. We are of the opinion that they are intended to represent the form of an arrow. On the reverse side, are two holes above the oval perforation which are not drilled through the stone, and which lie close to it just under the horizontal groove. The remarkable part of this stone is that the symbol, three,

PLATE XXXV.

The "Owl Ornament"; found in a Ft. Ancient Grave in 1882.
Front View. Full size.

occurs on it in three places—on the face twice, and on the reverse once. The farmer who sold it to the writer in 1884 claimed that he took it from a grave near the Great Gateway in 1882.

Plate XXXVII illustrates a grooved axe above, three celts in the centre, all of which are typical Fort specimens. At either side are two unfinished platform or monitor pipes of Catlinite. These latter were found two feet below the surface in the Old Fort, and lay together. There is nothing to indicate them to be modern. Although of Catlinite, they are of the mound pattern and appear to be old. They are in the museum of the Ohio State University, as are most of the specimens shown in the Plates illustrating objects.

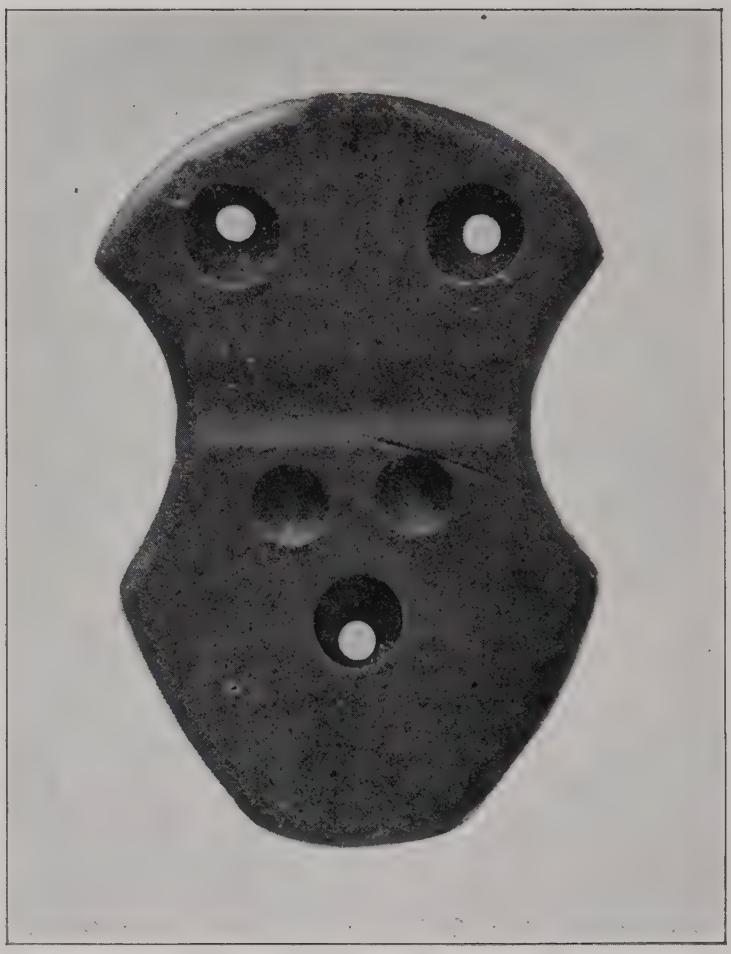


PLATE XXXVI.
Rear of "Owl Ornament".

CHAPTER IX.

THE FORT ANCIENT CULTURE. EXPLORATION OF OTHER MOUNDS, ETC., IN THE LITTLE MIAMI VALLEY.

The entire Great and Little Miami, and the Scioto Valleys, present two cultures. These have been referred to frequently in the writer's previous publications and field work, 1887 to 1898. Professor W. C. Mills began work in the same region in 1898 and his explorations have added much to the knowledge of ancient tribes in Ohio. He has designated these two cultures by appropriate and brief names: — The Fort Ancient and the Hopewell — each standing for something different.

While the Hopewell culture is confined to the Scioto and such tributaries as the two Paint Creeks and does not seem to extend above Columbus, the Fort Ancient included the whole of the Miamis above Milford and East Fork, Brush Creek and the watershed dividing the Miami and Scioto basins. The stone graves and mounds of this region, even fifty miles from Fort Ancient, are strongly of that type and not of the higher Hopewell character.

In preparation for the writer's conclusions, it is therefore necessary to reprint here certain explorations of the territory east and south-east of Fort Ancient.

In 1890 some weeks were spent in Clinton County opening mounds upon Cowen's Creek, Todd's Fork, and other streams. Of one mound the Field notes state:

Scattered through the upper part of the structure were many pieces of flint broken and partially worked. They were of a grayish-white color. The earth forming the structure had been scooped from the surface of some village site, hence the presence of flint flakes and blocks. One small spear-head of pink and white quartz was taken from a small ash-pit midway between the summit and the base. Implements of such material are rare in southern Ohio.

Near the exact centre of the mound, about eighteen inches from the surface, was found a small tablet, five by

PLATE XXXVII.

Types of Spear-heads from Fort Ancient. Phillips Academy Collection. Size, 1-4.

four and a quarter by three fourths of an inch, composed of sandstone. This remarkable object was taken from a mass of sticky, yellow clay, its position being carefully noted by the six persons present. Upon two sides were three grooves of the same depth, similar to those upon the back of the famous "Guest Tablet" found in a mound upon the site of Cincinnati during the early part of this century. Along both the narrow edges were two shallow grooves, while on the ends were two short but deep grooves. The depth of the various grooves range from one sixteenth of an inch to one third of an inch. The tablet has the appearance of serving the purpose as a sharpener of bone or copper tools.

The mound is presumed to be a house site, as posts extended into the structure to a depth of three feet and formed a square twelve feet on each side. The posts were burned and charred so that little remained of them. Near the tablet were two pockets of charcoal and also a large limestone, fourteen by sixteen inches, polished upon one side. The latter may have been used for grinding corn, as scratches seen upon its surface are rotary in character and may have been made by a stone pestle.

Another tumulus, 57 x 45 feet, was erected on a hard burned floor. Three skulls, entire, and three cremated skeletons, a fine gorget of diamond shape and other objects were found.

Other mounds yielded a few copper bracelets, ornaments, and projectile points. No altars, no pipes, no mound-groups, no caches of implements were found.

Passing up East Fork of the Miami into Clermont County, we are forty miles southeast of Fort Ancient. Here work was done in May, June and July, 1888.

As the size and number of the mounds and earthworks seem to be in direct ratio to the fertility of the soil, we would not expect to find within the area drained by the East Fork so many large mounds as are to be seen in sections more favored by nature, or to obtain from them such a number and variety of specimens conforming to

aboriginal ideas of utility and beauty. Investigation confirms the belief.

A small mound, 25 feet diameter and 2 feet high, on Mr. Shumard's farm, Stone Lick Tp., was opened. A layer of

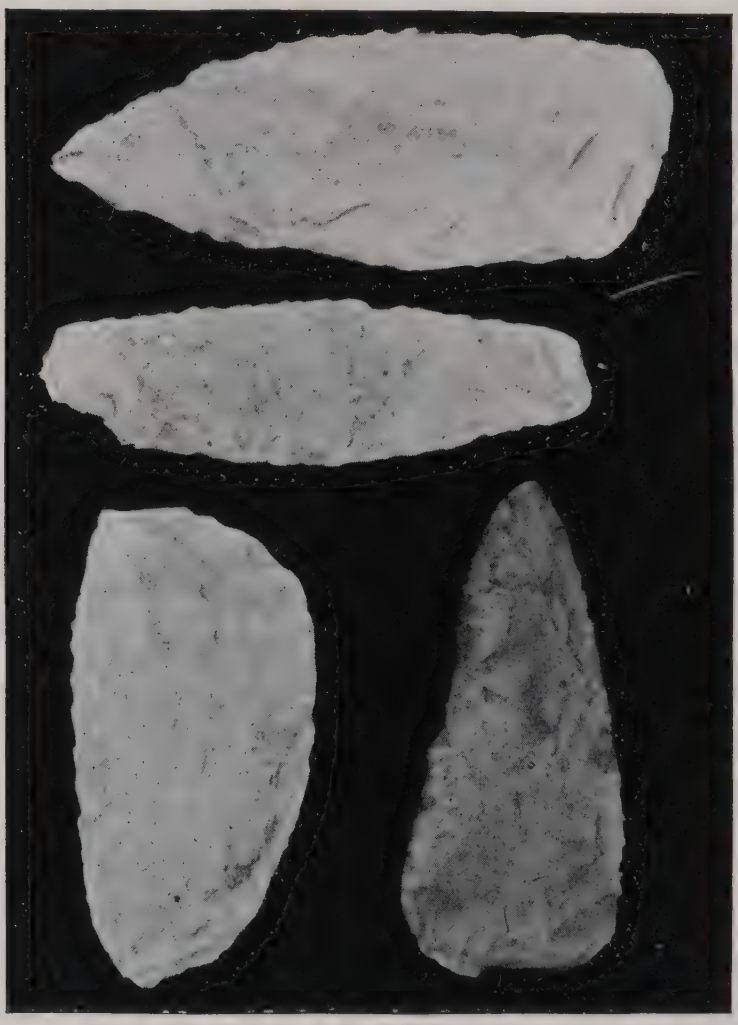
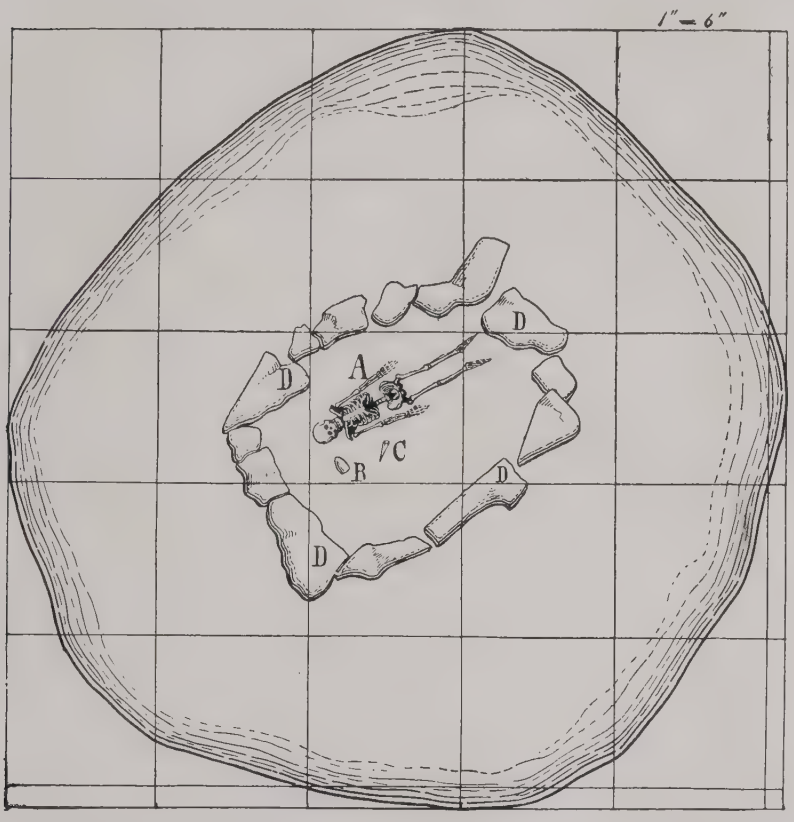


PLATE XXXVIII.
Fort Ancient Flint Knives. 1-2 size.

charcoal extended through, one foot above the base line. There was a floor or pavement of limestone slabs beneath, composed of stones 20 to 30 inches long, about a foot in breadth. These stones were thick and heavy,

and weighed perhaps forty or fifty pounds each. This pavement measured nine or ten feet in breadth.

On taking away the stones at the central portion, we found a layer three inches in thickness of com-



PL. XXXVIX.— Ground plan of mound No. 1. Skeleton surrounded by stone slabs. See page 136.

mon soil, covering a skeleton of medium size (A in the figure). We removed this dirt, which had evidently been placed to prevent the stones from coming in contact with the body, and thus endeavored to secure the skull. Although the greatest

possible care was exercised, atmospheric agencies had reduced the bones to such a fragile state that their removal was an utter impossibility, and we were unable to preserve any portion of the skeleton save the lower and upper jaws and some fragments of the skull.

Near the right side of the skeleton lay a small polished bone awl or perforator (C in the figure); about twenty inches from the right shoulder was a finely polished celt of greenstone (B), four and a half inches in length and two and one fourth wide. Underneath the body was a mass of red ochre.

Stone graves are numerous in the region and several were opened, but these seemed to be of the Fort Ancient type.

In Adams County similar graves have been opened in 1894 and 1896 by the writer, and in 1907 by Mr. Coover. There are large numbers of them scattered through Pike, Clement, Brown and Adams Counties.

A mound on Mr. Harvey Anderson's farm, Marathon Tp., contained burials and implements. Near the centre of the mound a pit had been dug to a depth of nearly two feet below the original surface, and the sides of it burnt quite hard; this was filled with ashes, fragmentary bones, and calcined limestone, intermingled with which were a few mussel shells, pottery fragments, and pieces of deer antlers. Just above it was a slab of limestone fifteen inches wide, and nearly three feet long, which had been almost disintegrated by an intense heat. Adhering to the upper side of the stone were portions of ribs and traces of vertebrae, burned until they were scarcely distinguishable. It was plain that a skeleton or body had been placed on this stone, and then cremated.

Another mound in Perry Tp. covered two burials and some artifacts. One of the skeletons was partially covered by a

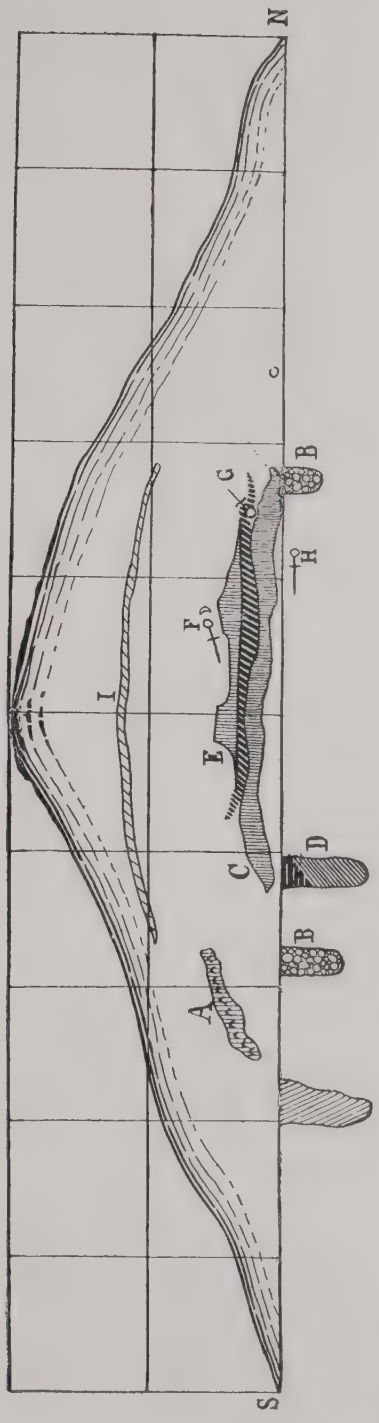


FIG. XL.—Vertical section of mound No. 6.

layer of mica, consisting of forty-one sheets, the edges of which had been slightly trimmed to give them a more regular outline. They occupied an irregular space of about two by three feet and were so placed that the edges somewhat overlapped in the same manner as scales on fish. A single piece lying to one side, was much larger than the others, being five by eight and one half inches, and half an inch thick. The skeleton itself was so decayed that no portion of it could be recovered.

A careful examination of the entire tumulus disclosed nothing more than the objects mentioned.

MOUND NUMBER SIX.—The mound about to be described lies upon very high ground and overlooks the East Fork.

In company with the mound described, it is on Mr. John Boyle's farm, Brown County, near St. Martins. At time of excavation it was 7 feet high and 70 feet base, surrounded by a circle. (See Plates XL, XLI.)

Post holes were numerous, and formed a circle about the base. Charcoal and calcined bones (A in figure) were numerous. The post-holes — unusually large — were 20 inches across and 14 to 16 inches at the bottom, three feet deep, and filled with small, flat, slightly burned pieces of limestone, weighing from two to three pounds each; they are shown at B in the figure. The spaces between the stones were tightly packed with earth which had also been burned. No relics or remains of any kind whatever were placed with them.

While, as before mentioned, these pockets are of frequent occurrence, in all our experience of mound opening we have never met with another instance in which they were completely filled with burned stones; nor can we recall a similar example in the reports of other explorers.[1]

As we proceeded with the trench a heavy layer of earth was discovered (C), burned until the upper surface had become a bright red color; this lay about six or seven inches above the large pockets, and was separated from them by a mass of very fine black earth (D).

The clay composing the burned layer had been placed in the mound when in its natural state, and a fire kept burning upon it for a considerable time. The earth above showed some evidences of the heat, as though it had been piled on while the clay was still very hot; but owing to the thickness of the latter the heat had not penetrated to the black loam below; at least not to a sufficient extent to produce any alteration in its appearance.

When we reached the centre of the mound we made the most important find of the week. A rough altar of hard burned clay, represented by E in the figure, had been constructed six inches above the burned stratum, and resting

[1]Since the above was written pockets filled with burnt stone were examined in the Hopewell group of mounds, Ross County.

upon a little mass of charcoal. It was oval in outline, measuring seven by nine feet, the longer axis being east and west, and was ten inches in height. The upper surface dipped slightly from the edge toward the centre; extended upon it at full length, with head to the east, lay a skeleton (F). Both the skeleton and the altar were unusually well preserved, but the latter was so thin and soft that it was impossible for us to remove it; an enlarged view of them is given in Fig. XLI.

There was copper plate above the forehead. When the find was made its true significance did not appear to me. The builders of this tumulus, I am persuaded, knew of the Hopewell culture—of the Scioto tribes. And they tried to imitate an altar burial. Whereas the Scioto people burned what was placed in the altars, these people put in the skeleton and did not burn it; they constructed their altar on different lines, did not burn it hard and made no offerings. It is probable that they were on the borderland between the two cultures. The mound is of interest and importance because of this altar burial.

It is unnecessary to speak of other interments and objects —although nearly a score of mounds were opened.

We have looked at tributaries, let us examine the Little Miami Valley itself. The entire Little Miami valley above the locality of Fort Ancient, beginning far up the stream at Cedarville Cliffs, in Greene county, and extending down to its junction with the Ohio river, might be said to have been occupied throughout by primitive man. We find mounds upon the hills that line the river on each side. Numerous village sites occur as we descend, and here and there we find, on some plateau, a circle or a fortification.

At the cliffs of the Miami, there is a large mound, 31 feet in height; and a small inclosure, with a number of gateways, on Massie's creek. Coming further down the river, we encounter, in the neighborhood of Xenia, a number of mounds, and one large tumulus, inclosed by a circular embankment.

Down the river further, at Alpha, we find a number of small mounds on the hill-tops bordering on the stream.

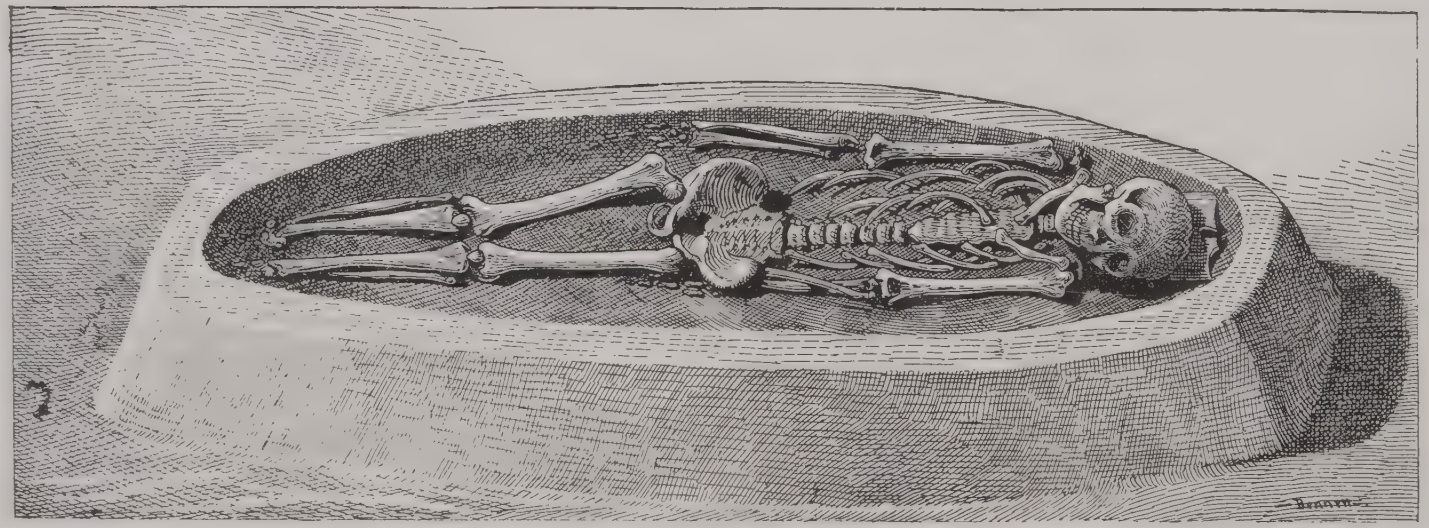


PLATE XLI.

Skeleton from Boyle's Mound, and Depression in which it Lay.

At Spring Valley there is a mound inclosed in a circle. This was opened about ten years ago, and many skeletons and interesting relics found. At Waynesville there is a small cemetery on the east bank of the river, where some 45 individuals have been dug out at various times. Below Waynesville we find several mounds, two large village sites, etc. At Oregonia (formerly called Freeport), there are several mounds and two large village sites. These latter have been productive of great quantities of bones, shells, beads, etc. Passing Fort Ancient, we come to Mill Grove, where the hills are in places covered with many stone graves, and where there are a number of small mounds. At Morrow, we are told, skeletons have been found, and at South Lebanon there is a fort, square inclosure, circle, and small mound. The mound was opened in 1877, and yielded many skeletons, and some very large and beautiful copper axes. There were nine of these axes found; they weighed about three pounds each, and were made of the Lake Superior copper, which was beaten out in the cold state; they are now in New York City.

At King's Mills several skeletons have been found, and at Foster's Crossing there is one mound and a good sized inclosure. We have been given the following description of it: It is on a high hill back from the river, and incloses 12 or 15 acres. The embankment once stood about 10 feet high in the highest place, with an average of six feet. There is some stone in its construction, but not much. In places there appears to have been a hot fire, as the earth is burned to a considerable depth. There are numerous gateways; the embankment now stands about three feet high and twenty feet base. The cemetery at Madisonville, in which Harvard University has explored for a generation, yielded thousands of skeletons and is not exhausted. It is too familiar to need description here.

Near Fort Ancient, two monuments exist that have not been mentioned in preceding pages. Directly opposite, on the west bank of the river, and on fully as high hills, there is a small circular embankment composed entirely of earth, and a moat on the interior. The circle if three feet high,

160 feet in diameter, and the moat two feet deep. The width of the embankment composing it is about 10 feet. There are few artifacts found in the neighborhood of the circle, and no stone in its construction. It overlooks the river on one side, and on the south there is a deep ravine flanking it.

Back of Fort Ancient, on the plateau, and one and a half miles to the south-east, are three good sized mounds. The first one was dug out a year ago, with the following results: A roughly laid stone wall was near the outer edge of the mound, and extended entirely around it. Within this stone wall, with their feet toward the center, lay 15 skeletons. Near one skeleton were some twelve curious ornaments of bear teeth, with perforations through them. They have the same curvature on the sides that the tooth has before it is altered, but they are flattened at the edges somewhat, and the point of the tooth, or crown, has been filed off, and the ornament made quite sharp. The teeth that were unworked, save for the peforations, were of the average size of the black bear, and had from two to three holes in each.

CHAPTER X.

CONCLUSIONS ON FORT ANCIENT

Deliberation upon the studies of Fort Ancient made in past years leads one to certain conclusions. These may not be clear except to archaeologists who have given the enclosure some thought, for Fort Ancient by its very nature is a place not to be understood save after many visits. But one is of the opinion that given the same length of time in exploration, other observers might concur with the writer in his general conclusions, and differ in unimportant details. Until May of this year the writer has purposely refrained from seeing it and ten years have passed since his last visit. Therefore a retrospective view may not be devoid of small value.

That it is defensive most persons will admit, although military men, measuring it by modern standards, observe many weak points.

That it is 800 or 900 years old, the writer firmly believes —yet there are some who will not accept this statement.

Historic tribes knew naught of Fort Ancient, and no modern Indian village was nearer it than "Old Chillicothe", in Greene County (the site of Kenton's and Boone's captivity), 25 miles north. There are *no* stone graves at that Chillicothe, or at Frankfort (Chillicothe-on-Paint-Creek), or at Cornstalk Town — 40 and 50 miles distant. The Shawanoes lived in numbers at all of the above towns. This fact is rather significant, for Dr. Cyrus Thomas took exception years ago, to the writer's statement that the Fort Ancient stone graves were not Shawano. At that time my contention was based on the age of certain large trees. To some minds this is not a sound argument, yet it must be borne in mind that while some trees grow rapidly, others do not. However, supposing that *none* of the Fort Ancient trees are old, (which I do not believe) I shall present the matter in a different light. One would suppose that the mortuary and other arts at Fort Ancient would bear

striking analogies to the culture of Shawano sites, if Fort Ancient people were related to those Indians. On the contrary no such similiarities are noticed, and Fort Ancient and Madisonville are identical; not Fort Ancient and Shawano sites. Again, limestone slabs abound near the Chillicothes, yet no graves lined with them — no stone graves whatsoever — have been discovered. It is likely that no Shawano people ever lived at Fort Ancient and the writer is persuaded that his original statement to that end is correct.

Fort Ancient does not appear to be southern in the sense that the Scioto Valley tribe was influenced by southern culture; or vice versa. Flint Ridge flint and local chert abound. Tennessee nodular flint is rare. The 8000 flint discs found in mound No. 22 of the Hopewell Group are probably from Little River (Tennessee) quarries and indicate a close connection between the Cumberland–Tennessee peoples and the Hopewell tribe. Not so at Fort Ancient. Aside from some white quartz points and chippings there is little of foreign origin. Even northern copper is rare, galena and obsidian are absent; ocean shells, pearls and mica — save a very little mica — have not been found.

Professor Mills obtained from a farmer some copper earornaments, pendants and other objects which had been plowed up near the Fort walls. While apparently a cache, it was peculiar in that the mass had been purposely hammered together, so much so that many of the copper objects were well-nigh ruined. One may conclude that this copper did not belong to Fort Ancient people. No sane trader would destroy his own wares and no chief or shaman could bring himself to destroy that which carried more or less religious significance in ceremonies. All copper — judging from the conditions under which we find it in the mounds — was valuable and more or less "mystery". It seems likely that the Fort Ancient copper mass was obtained during a raid by Fort Ancient warriors against the Hopewell culture on the Scioto; or obtained by a war-party from the natives of the "Turner Group", thirty miles down the river.

Having no use for the ornaments of a rival or hostile nation, and to show contempt for such objects as were valuable to the higher developed Hopewell or Turner people, the victors hammered up their spoils. Similar incidents of destruction of property in historic times among warring tribes, are common. The incident of the copper is a further confirmation that the two cultures were separate and distinct, and the tribes hostile to each other. Professor Mills' terms — "Hopewell culture" and "Fort Ancient culture", clearly and tersely indicate the difference.

Madisonville, the large cemetery and village site twenty-five miles down the Little Miami, is distinctively Fort Ancient in its ceramics and stone arts. Yet Madisonville may have been occupied for a greater length of time than Fort Ancient. That is, from the strictly prehistoric down to the historic although the writer is persuaded that Fort Ancient is the older. A study of the Madisonville collections and those from Fort Ancient shows the close relationship. A few glass beads, bit of brass and piece of iron were once found in a Madisonville grave. The quantity was insignificant and it seems to the writer that the grave must have been intrusive, for had Madisonville been occupied in historic times, more than these few European things would have been found.

Harvard University, the Cincinnati Society of Natural History and Doctor Metz have dug there more or less continuously for thirty years. No aboriginal cemetery in America is of such extent and none have furnished such a quantity of material.

It does not seem to me that one should set aside all the thousands of stone, shell, bone and clay objects which are certainly prehistoric, and accept these few things as indicative of modern culture at Madisonville.

Catlin advanced a theory that the Mandans were the Builders of Ohio Valley monuments. In my book, "Fort Ancient", I inclined towards that proposition. But after some study of the Mandan collection at Andover and an inspection of the Peabody Museum Mandan exhibit, I wish to modify the statement made in 1889. If they came from the

Ohio valley, they made a radical change in their arts, for the Mandan implements and pottery — save a peculiar decoration on the pottery — do not savor of Ohio Valley culture. The flint knives from Mandan sites are long and slender, being very unlike Ohio types; axes are quite rare; the celt is not common, and problematical forms as well as the ordinary slate ornaments are wanting. All Mandan implements, pottery, etc., have a fresh or recent appearance. On the pottery, even the soot remains. No Ohio valley specimens appear modern, all are weathered.

The Hopewell Culture extended eight or ten miles up the Little Miami to the "Turner Group", some miles below Madisonville. In 1886–7, Professor F. W. Putnam found remarkable problematical forms in copper, mica, terra-cotta and shell in the altar mounds at this place.

Above Madisonville, or eighteen miles below Fort Ancient, is a hill-top fortification, overlooking the Miami at Foster's Crossing. The Foster's work was partly explored by Professor Putnam and appears to be of Fort Ancient culture status.

Reviewing the entire field of these Hopewell and Fort Ancient cultures, it seems to me that a thorough study of the reports and collections relating to ancient man in southern Ohio, and further exploration in the Muskingum Valley and along the Ohio may prove that local cultures were developed independently of each other and extended over a considerable period of time.

Assuming that the gravel hill or glacial kame burials, common in southern Ohio, are totally different from mound and village site interments — or indicate an earlier tribe — which the writer is convinced is true, one may surmise that early man buried his dead in these gravels, where digging was easy. Moreover, the rounded slopes — almost artificial in character — may have suggested to him presently, the building of mounds. Be that as it may, it is scarcely reasonable to conclude that man began the construction of large earthworks immediately upon his arrival in the Ohio valley. There must have been a long process of development; and the complicated works of the Scioto, while of considerable

antiquity, were built after man had learned to construct the simpler hill-forts, circles and what-not. Whether the builders came from the South or the Northwest, or the East matters not. The culture they developed was local and while the objects and art were southern-like in character, their mounds and enclosures were not of the southern type.

What Dr. Thomas has called the "Problem of the Ohio Mounds", is a problem of Fort Ancient and Hopewell and Gravel Hill cultures — not a problem relating to Shawanoes and Cherokees as Ohio mound-builders. If Cherokees and Shawanoes built Ohio earthworks, it was in times of remote antiquity; for certainly neither tribe presented any similarity to Ohio culture in historic times. Cherokee pipes are the antithesis of Ohio pipes. And a carefnl comparison of Cherokee, Shawano, and Fort Ancient villages reveals nothing in common.

On the sites of historic Indian villages but little material is found The great Illinois town, mentioned often by La Salle and Hennepin, and which contained thousands of Indians, exhibits far less surface indications in the way of arrow-points and flint chips than any of the large prehistoric sites in Ohio. Before the American Association for the Advancement of Science at the Brooklyn meeting in 1894, I read a paper entitled, "An Inspection of Modern Indian Village Sites in Ohio". Two paragraphs are reprinted as follows: —

"Taking Cornstalk town by way of example, the amount of goods distributed by the English in one year amounted to more than $50,000. The town contained (1730 to 1780) more than one thousand persons, and the population was constanly ranging above or below that number as war parties left and councils, assemblies, etc., called in surrounding tribes. It is not necessary for me to enlarge upon the number of iron, copper, silver and lead objects which must have been lost, traded, carried away or buried. It is only important that I should call attention to the singular fact that so few modern implements should be found upon town sites where a population is known to have existed for more than seventy-five years.

"The prehistoric sites furnish pottery, stone, bone and shell relics very like those found upon the modern sites. We must, therefore, conclude that the quantities of such material found upon historic sites indicate that the introduction of more serviceable utensils, weapons and ornaments did not displace the old and more primitive forms, but that both were in common use; or, that the ancient forms and the rough pottery sherds and rude stone relics marked the site of towns which existed before the advent of the traders; or, lastly, that the use of native material was not abandoned for the newer utensils. In any event, we must accept the proposition that nearly all of the relics left by the traders have either disappeared or resolved themselves into dust as a consequence of the action of the elements, or were so well cared for as to be taken away by the tribe on their removal from the locality. The finding of an occasionally rusty knife blade, pieces of iron and gun lock would indicate that the latter contention is not established."

No observer who has spent time in fieldwork will deny that the prehistoric sites furnish much more evidence of occupancy and activity than the modern.

The writer is convinced that Professor Mills' explorations in the "high-culture" groups of the lower Scioto, and his own diggings at Hopewell and elsewhere indicate that Squier and Davis were not so wrong in their conclusions as has been claimed by writers who have never seen a "high-culture" group explored.

Again, the enclosures at Fort Hill, Glenford, Spruce Hill and similar places are more nearly like Fort Ancient in conception than the valley works. Later detailed exploration may indicate that the hill forts were not of the culture of the geometric works in the river valleys and that the Fort Ancient people were concerned in their construction. This is, of course, conjectural but by no means are all the indications against such a theory. We have but begun the right study of the "Problem of the Ohio Mounds". It is not a problem of variation of a few feet in the accuracy of a square or circle as given by Squier and Davis. The plow

will account for such discrepancies. Neither is it a problem of "high civilization" — which nobody of intelligence believes at the present time. But it is a problem nevertheless and it will be years in working out, for it deals with details and observations such as must be made in the field.

Fort Ancient's builders appear, from all available data, to have occupied a territory seventy miles north and south, eighty miles east and west. The Great Miami valley presents Fort Ancient culture — it is not of the Scioto. We may surmise that they were hostile to Hopewell or kindred peoples. That there was much difference in the age of the Scioto and the Miami works, I doubt, although it is possible that Fort Ancient is older. Extensive explorations in, and a study of the pottery and implements found in the ditches leading north and south from the mounds just east of the New Fort, may shed light on the problem. If no Madisonville type of pottery is found in these ditches, we may conclude that the people of the valley villages were like Madisonville natives in art, but the dwellers in the Fort belonged to a different tribe. The ditches are a part of Fort Ancient and were open, of course, at the time the Fort was occupied. Therefore I hold that what is taken from them, and also from the village in the north end of the South Fort — in the woods, where original conditions have been preserved — may furnish significant testimony. It has been intimated in my previous articles on Fort Ancient that the excavations on the hill should be more thorough — particularly at the points named. Much repetition of facts will naturally result, but of more consequence will be the data relating to the art of Fort Ancient's builders. The ditches will be more reliable on this score than the surface village-sites.

Fort Ancient is a wonderful place. It is far more impressive than the Serpent Mound and stands foremost among the prehistoric monuments of America. It is well that the State of Ohio has vouchsafed to future generations its preservation.

The amount of labor expended upon Fort Ancient by its builders is an indication of its importance and, perhaps,

may aid us in determining the time occupied in building the embankments. Dr. Thomas has begrudged the poor natives less earth than they made actual use of, and other observers have placed the amount of material at an absurdly high figure. Those who have stated the amount in figures have spent little time at the Fort in study, and it is quite natural that certain significant facts should escape their eyes.

Much of the earth from the embankments washed into the moats — earth naturally seeking the lowest level. And where moats did not occur, the inside of the Fort being lower, rains swept the earth down upon the general level. In estimating the amount of earth used, the depth of the ditches must be added to the height of the fort walls.

No one has appreciated the amount of stone made use of by the builders, for fully one-third of Fort Ancient is stone. This stone could not have all come from the space enclosed, or from the ravines adjacent. Much of it must have been carried from the Little Miami River half a mile distant, and up a long, steep slope.

I wish to assert that a study of the stone in and about Fort Ancient reveals to one that there was almost as much labor expended in digging it out and carrying it up to the enclosure above as in moving the immense number of baskets of earth comprising the main walls. Indians did not quarry stone in the sense that we do, but they certainly understood breaking it after a primitive fashion. As they found many of the slabs too large to be carried, they broke them. Rude stone hammers and levers were necessary to detach projecting and more or less loose stones in the clay banks — for in the ravine beds they could not find sufficient material. In addition to the stone, glacial clay — which must have been quite difficult for the natives to dig up, considering their lack of tools — was also used extensively. The terraces required much excavating. All this labor required the presence of one or two thousand natives (at least) for a generation.

NOTES ON SURVEY OF FORT ANCIENT.

In order to render unnecessary a re-survey of Fort Ancient, the author inserts the plates of the original survey notes, as compiled from Mr. Cowen's data and Transit Book.

The initial point is on top of the first embankment of the eastern wall, on the south side of the Lebanon and Chillicothe turnpike; the angles being turned off to the right.

Stations.		Bearing.		Dist.	
0 to	1	S	9.30 E	78.6	End * of first wall.
	2	S	5.20 E	41	Center of first opening, or "gateway."
	3	R	12.08	37	Top of second wall. The bearings to Sta. 2 were taken with the needle; the succeeding ones were read by means of a vernier.
	4	R	25.51	116.6	End of second wall.
	5	R	27.08	32.5	Center of second opening.
4 to	6	R	43.05	31	Top of third wall.
	7	R	45.25	156.5	End of third wall.
	8	R	44.25	36	Center of third opening.
	9	R	44.10	26	Top of fourth wall.
	10	R	37.00	101.5	End of fourth wall.
10 to	11	R	21.08	31.8	Center of fourth opening.
	12	R	21.08	18.6	Top of fifth wall.
	13	R	18.05	67	On fifth wall.
	14	R	13.20	44.8	On fifth wall.
14 to	15	R	4.00	38	On fifth wall.
	16	R	27.10	62	On fifth wall; outcurve.
16 to	17	R	33.15	33	On fifth wall.
17 to	18	R	31.19	24	End of fifth wall.
	19	R	35.48	26.6	Center of fifth opening.
	20	R	51.30	22.6	Top of sixth wall.
	21	R	63.35	37.4	End of sixth wall, at edge of ravine.
	22	R	68.00	33	Bottom of ravine
	23	L	26.10	23	Top of seventh wall.
	24	R	14.08	38	On seventh wall.
24 to	25	L	26.10	85.6	On seventh wall.
	26	L	16.00	21	On seventh wall.
	27	L	5.36	20.7	End of seventh wall.
	28	R	2.40	16.6	Center of seventh opening.
	29	R	9.00	15.8	Top of eighth wall, and beginning of regular curve.

* "End" of wall, means the end of the top portion farthest from the transit; while "top" means that nearest the transit.

The measurements, unless otherwise specified, are always from the next preceding station.

Stations.		Bearing.	Dist.	
29 to	30	R 27.35	52	On eighth wall.
	31	R 34.20	31.6	On eighth wall.
	32	R 42.50	34.4	On eighth wall.
	33	R 49.30	31.8	End of eighth wall.
			+17	Center of eighth opening.
	34	R 68.40	31	Top of ninth wall.
	35	R 78.20	55.6	End of ninth wall.
	36	R 85.10	29	Middle of ravine.
	37	R 82.30	46	Top of tenth wall.
37 to	38	R 25.03	53	On tenth wall; beginning of curve.
	39	R 21.00	85.3	On tenth wall.
39 to	40	R 75.35	45.8	On tenth wall.
	41	R 86.15	57.5	End of tenth wall.
	42	R 93.35	16.5	Center of tenth opening.
	43	R 98.20	14.5	Top of eleventh wall.
	44	R 118.00	38	On eleventh wall.
	45	R 138.50	72.8	Top of deep ravine.
45 to	46	R 111.00	78	Bottom of deep ravine.
	47	R 97.30	102	Top of twelfth wall. On both sides of this ravine [from 45 and 47 to 46], the wall extends down the slope to the bottom, in a straight line, as if it had at one time been continuous across.
47 to	48	R 11.50	153	End of twelfth wall.
	49	R 15.50	15	Center of twelfth opening.
	50	R 20.15	16.5	Top of thirteenth wall.
	51	R 35.15	52.2	On thirteenth wall.
	52	R 39.15	20.9	On thirteenth wall; incurve.
	53	R 31.15	23.8	On thirteenth wall; incurve.
53 to	54	L 6.50	45.1	End of thirteenth wall.
	55	R 5.30	17	Center of thirteenth opening.
	56	R 28.20	15.3	Top of fourteenth wall.
	57	R 60.38	57.7	On fourteenth wall; outcurve.
	58	R 57.15	37.2	On fourteenth wall; outcurve.
	59	R 46.40	48	End of fourteenth wall; outcurve.
	60	R 48.00	15.6	Center of fourteenth opening.
	61	R 51.45	16.6	Top of fifteenth wall.
	62	R 68 15	67	On fifteenth wall.
	63	R 75.00	41.9	On fifteenth wall; incurve.
	64	R 74.00	21.1	On fifteenth wall; incurve.
	65	R 69.30	29.8	On fifteenth wall; incurve.
	66	R 54.45	96	End of fifteenth wall.
66 to	67	R 68 00	16.2	Center of fifteenth opening.
	68	R 78.50	15.5	Top of sixteenth wall.
	69	R 101.40	31.9	On sixteenth wall.
	70	R 102.00	19.3	On sixteenth wall; incurve.
	71	R 93.05	24.9	On sixteenth wall; incurve.
	72	R 79.33	34.3	On sixteenth wall; incurve.
	73	R 57.15	78.6	On sixteenth wall; incurve.
	74	R 47.45	36	On sixteenth wall; incurve.
	75	R 38.15	45	On sixteenth wall; incurve.
	76	R 33.42	22	End of sixteenth wall, at top of ravine.
76 to	77	R 23.21	96	Top of seventeenth wall, on opposite side of ravine, at top of slope.
	78	R 15.35	50.3	On seventeenth wall.

Stations.	Bearing.	Dist.	
76 to 79	R 19.20	68.4	End of seventeenth wall, on top; outcurve.
80	R 23.04	22.6	End of seventeenth wall, at bottom.
81	R 37.48	64.1*	First end of eighteenth wall, at inside part.
82	R 32.05	25.6	First end of eighteenth wall, at inside part, on top.
83	R 28.25	20.8	Second end of eighteenth wall, on top, on regular line of wall.
83 to 80x		24.3	Measured back in a direct line toward Sta. 80, and distant from that station 33.5† feet. From Sta. 80 to Sta. 80x, is the seventeenth opening. Stas. 81 and 82 are at the end (on bottom and top, respectively) of a spur, which goes in toward center of fort from Sta. 83.
84	R 2.50	64.1	End of eighteenth wall.
85	R 19.25	26.8	Center of eighteenth opening.
86	R 26.25	14.5	Top of nineteenth wall.
87	R 42.25	56	End of nineteenth wall, on top, at edge of ravine.
88	R 51.05	20	End of nineteenth wall, at opening 19, bottom of ravine.
89	R 51.07	24	Top of twentieth wall, on opposite side of ravine, the wall running up on the slope from the bottom.
90	R 47.30	39	On twentieth wall.
91	R 50.30	97.1	End of twentieth wall, on top.
92	R 53.45	33.4	Center of twentieth opening.
93	R 53.15	23.2	Top of twenty-first wall.
94	R 49.20	40.7	End of twenty-first wall.
		+17	Center of twenty-first opening.
94 to 95	R 6.00	34.2	Top of twenty-second wall.
96	R 4.20	37.8	On twenty-second wall.
97	R 20 15	56.3	On twenty-second wall; outcurve.
98	R 31.25	54.1	On twenty-second wall; outcurve.
99	R 34.45	54.8	End of twenty-second wall, on top.
100	R 35.35	18	End of twenty-second wall, at bottom; also, end of the east wall of the "new" or northern portion of the fort.
100 to 101	R 46.45	103	To bottom of so-called "mound;" the initial point of the east wall of the "old" or southern portion of the fort. Only the natural surface exists from Sta. 100 to Sta. 101, there being no indication of artificial deposits. This is not a "mound" at all, but only a heavier wall than those near it.
102	R 33.10	35.5	Top of twenty-third wall ["mound"].
103	R 30.15	18.5	Highest point of twenty-third wall.
103 to 104	L 24.00	48.3	End, on top, of twenty-third wall; incurve.

* This measure to be used only as a check in drafting, and not to be added in obtaining length of fort wall.

† This measure to be added.

Stations.	Bearing.	Dist.	
105	L 37.05	15.4	Center of twenty-third opening.
106	L 50.45	18	Top of twenty-fourth wall.
107	L 89.15	48.8	On twenty-fourth wall.
108	L 96.06	36.5	End of twenty-fourth wall; outcurve.
109	L 95.30	18.2	Center of twenty-fourth opening.
110	L 98.40	51.4	Top of twenty-fifth wall.
111	L 100.40	35.9	On twenty-fifth wall.
111 to 112	L 85.20	77.9	On twenty-fifth wall.
113	L 75.25	94.2	On twenty-fifth wall.
114	L 69.32	45	On twenty-fifth wall; outcurve.
114 to 115	L 30.45	107.6	End of twenty-fifth wall.
116	L 26.50	17.7	Center of twenty-fifth opening.
117	L 25.24	15.9	Top of twenty-sixth wall.
118	L 19.30	45	On twenty-sixth wall.
119	L 11.40	63.7	End of twenty-sixth wall, at ravine.
120	L 8.00	25.1	End of twenty-seventh wall, at ravine, on opposite side.
121	R 2.00	65.7	On twenty-seventh wall.
121 to 122	R 59.55	49	On twenty-seventh wall; outcurve.
123	R 75.45	58	On twenty-seventh wall.
123 to 124	R 88.15	39.1	On twenty-seventh wall; incurve.
125	R 75.45	29.3	On twenty-seventh wall; incurve.
126	R 56.40	28.8	On twenty-seventh wall; incurve.
127	R 19.55	90.5	End of twenty-seventh wall, at edge of ravine.
128	R 14.30	37	Top of twenty-eighth wall, at opposite edge of ravine.
126 to 129		41	End of twenty-eighth wall. The bearing could not be obtained, but Sta. 129 is on a line between Stas. 128 and 130.
130	L 4.45	15.2	Center of twenty-eighth opening.
131	R 1.40	19.5	Top of twenty-ninth wall.
132	R 23.20	65.4	On twenty-ninth wall.
133	R 38.35	43.4	On twenty-ninth wall; incurve.
134	R 49.15	33	On twenty-ninth wall.
135	R 52.25	43.2	On twenty-ninth wall; incurve.
136	R 64.48	45.9	On twenty-ninth wall.
137	R 66.45	32.8	On twenty-ninth wall; incurve.
138	R 62.00	38.3	End of twenty-ninth wall.
139	R 60.50	18	Center of twenty-ninth opening.
140	R 62.30	15.8	Top of thirtieth wall.
141	R 65.30	27.8	On thirtieth wall.
142	R 65.40	29.4	On thirtieth wall; incurve.
143	R 61.55	38.2	On thirtieth wall; incurve.
143 to 144	R 41.30	41.9	On thirtieth wall; incurve.
145	R 9.45	54.4	On thirtieth wall; incurve.
146	L 10.40	60.2	On thirtieth wall.
147	L 14.30	31.1	On thirtieth wall.
146 to 148	L 49.30	68.7	On thirtieth wall; incurve.
149	L 35.51	61.8	End of thirtieth wall, on top; outcurve.
150	L 34.45	30	End of thirtieth wall, at bottom.
151	L 15.10	65	Beginning (at bottom) of thirty-first wall, on edge of ravine, opposite Sta. 149.

Stations.	Bearing.		Dist.	
152	L	12.40	45.8*	End of spur, on edge of ravine, below Sta. 153.
153	L	10.30	52.8	Top of thirty-first wall, above end at Sta. 151, 13.5 * feet from latter.
154	R	28.15	87	On thirty-first wall.
155	R	48.15	49.8	End of thirty-first wall, on top.
156	R	59.45	48	End of thirty-first wall, at bottom of ravine.
157	R	53.54	49.3	Top of thirty-second wal.
158	R	48.06	29.9	On thirty-second wall.
159	R	40.50	35.5	On thirty-second wall.
160	R	33.50	43.2	On thirty-second wall; outcurve.
160 to 161	R	23.05	54.2	On thirty-second wall; outcurve.
162	R	41.45	43.2	On thirty-second wall; outcurve.
163	R	59.25	53.7	End of thirty-second wall, on top; outcurve.
164	R	61.05	49	End of thirty-second wall, at bottom of ravine.
165	R	49.15	56.5	Top of thirty-third wall.
166	R	43.45	30.2	On thirty-third wall.
166 to 167	L	28.30	33	On thirty-third wall; incurve.
168	L	41.30	29	On thirty-third wall; incurve.
169	L	36.15	33.4	End of thirty-third wall, on top.
169x	L	36.15	49.2	End of thirty-third wall, at bottom.
170	L	27.15	15.2	Center of thirty-third opening.
171	L	16.30	18.5	Top of thirty-fourth wall.
172	R	12.45	49	On thirty-fourth wall.
173	R	52.20	63.4	End of thirty-fourth wall, on top.
174	R	73.22	46	End of thirty-fourth wall, at bottom.
175	R	75.50	44.9	Center of thirty-fourth opening.
176	R	66.30	41.3	Top of thirty-fifth wall.
177	R	52.25	78	On thirty-fifth wall.
177 to 178	L	2.20	76	On thirty-fifth wall.
179	L	11.15	66.5	On thirty-fifth wall; incurve.
180	R	1.35	57.4	On thirty-fifth wall; incurve.
181	R	2.42	20.7	End of thirty-fifth wall.
182	R	2.15	15.4	Center of thirty-fifth opening.
183	R	2.00	17.3	Top of thirty-sixth wall.
184	R	2.15	55	On thirty-sixth wall.
185	R	6.45	43.5	End of thirty-sixth wall.
183 to 186	R	26.00	17.1	Center of thirty-sixth opening, southeast corner of fort.
187	R	50.00	56.7	Top of thirty-seventh wall, south-east corner; the so-called "mound;" outcurve.
188	R	62.38	33.6	Center of thirty-seventh opening; outcurve.
189	R	75.45	34.4	Top of thirty-eighth wall; second "mound."
190	R	92.05	50.4	Bottom of second "mound," which is only a higher portion of thirty-eighth wall, and, like those at entrance, not a "mound" at all.

* Check measure, not to be added in.

Stations.	Bearing.	Dist.	
190 to 191*	L 29.45	74.3	End of thirty-eighth wall, bottom of ravine.
192	L 40.45	76.7	Top of thirty-ninth wall, top of ravine.
193	L 43.25	58	End of thirty-ninth wall, on top.
194	L 43.15	15.8	Center of thirty-ninth opening.
195	L 44.00	22.1	Top of fortieth wall.
195 to 196	L 32.15	70.5	On fortieth wall; outcurve.
197	L 27.15	70.5	On fortieth wall; outcurve.
198	L 22.30	66.7	On fortieth wall; incurve.
199	L 22.30	52	On fortieth wall; incurve.
200	L 25.25	64.3	End of fortieth wall.
201	L 22.15	20	Center of fortieth opening.
202	L 20.10	22.8	Top of forty-first wall.
203	L 13.40	41.1	On forty-first wall; outcurve.
204	L 8.10	34.6	On forty-first wall; outcurve.
205	L 2.15	35.7	On forty-first wall; incurve.
206	R 2 00	29.3	On forty-first wall; incurve.
207	R 4.05	40	On forty-first wall; incurve.
208	R 4.00	34.4	On forty-first wall.
209	R 5.15	34.8	End of forty-first wall, on top of deep ravine at south side of fort.
209 to 210	L 16.00	91	End of forty-first wall, in bottom of deep ravine.
211	L 34.50	46	Between bottom and top of slope, on forty-second wall.
212	L 36.20	17	Top of forty-second wall, above ravine.
212 to 213	L 97.15	47	On forty-second wall; incurve.
214	L 107.14	32.3	On forty-second wall.
215	L 106.45	42.1	End of forty-second wall; outcurve.
215 to 216	L 59.35	16.2	Center of forty-second opening.
217	L 42.40	19.1	Top of forty-third wall.
218	L 33.00	58.1	On forty-third wall.
218 to 219	L 57.15	48.8	End of forty-third wall, at bottom of ravine; incurve.
220	L 84.30	33.2	Top of forty-fourth wall, above ravine.
221	L 123.45	90.0	On forty-fourth wall.
221 to 222	L 137.15	54.2	On forty-fourth wall.
223	L 129.10	55	End of forty-fourth wall.
224	L 124.15	16.4	Center of forty-fourth opening.
225	L 120.00	11.8	Top of forty-fifth wall.
226	L 95.25	84	End of forty-fifth wall, bottom of ravine.
227	L 84.30	48	Top of forty-sixth wall, top of ravine.
228	L 74.30	61	On forty-sixth wall.
229	L 62.45	77.8	On forty-sixth wall.
230	L 55.30	82.6	End of forty-sixth wall.
231	L 54.00	18.2	Center of forty-sixth opening.
232	L 52.25	26.8	Top of forty-seventh wall.
233	L 47.10	54.4	On forty-seventh wall; outcurve.
234	L 40.45	73	On forty-seventh wall; outcurve.
235	L 30.00	111.8	End of forty-seventh wall, edge of ravine.
235 to 236	R 34.25	58	End of forty-seventh wall, bottom of ravine.
237	R 35.25	28	Top of forty-eighth wall.

* The reading of the needle was reversed at this station to avoid large angles.

Stations.	Bearing.	Dist.	
238	R 36.30	53	End of forty-eighth wall, on top.
239	R 37.10	40.3	Center of forty-eighth opening.
240	R 38.00	63	Top of forty-ninth wall. There is a gradual slope to this station from Sta 239, and an abrupt one from this to the next [241].
241	R 38.30	18	Center of forty-ninth opening.
242	R 38.25	25.8	Top of fiftieth wall.
242 to 243	R 32.55	149.5	On fiftieth wall.
244	R 35.00	47	On fiftieth wall.
245	R 38.50	64.2	On fiftieth wall.
246	R 42.00	35.3	End of fiftieth wall, on top.
246 to 247	R 62.45	66	End of fiftieth wall, at bottom, at the north-west corner of "old fort," overlooking the Miami valley.
248	R 86.45	17.7	Middle of a shallow depression, over the angle at corner of fort, leading, by a gradual slope, down to the river.
249	R 97.15	15	Top point of fifty-first wall, which unites here with the fiftieth wall, to form the point or angle [Sta. 248].
250	R 150.30	61.2	Middle of depression in fifty-first wall, where it has crossed a ravine near its head. The hole thus left above has filled up with muck.
251	R 163.30	71.5	On fifty-first wall; incurve.
252	R 160.30	94.5	On fifty-first wall.
252 to 253	R 112.15	54.3	End of fifty-first wall.
254	R 107.20	13.8	Center of fifty-first opening.
255	R 94.45	18.7	Top of fifty-second wall.
255 to 256	R 71.15	97.7	On fifty-second wall.
257	R 73.30	21	End of fifty-second wall, on top.
258	R 87.50	48	Center of fifty-second opening; outcurve.
259	R 85.20	21.7	Top of fifty-third wall.
260	R 88.05	45	On fifty-third wall; outcurve.
261	R 95.00	32.5	On fifty-third wall; outcurve.
262	R 104.45	80.7	On fifty-third wall.
263	R 105.30	34.6	On fifty-third wall; sharp incurve.
264	R 71.30	37.9	On fifty-third wall; incurve.
265	R 55.20	48	On fifty-third wall; incurve.
265 to 266	R 30.15	48.8	End of fifty-third wall, on top, incurve
266 to 266x	R 30.15	24.5	End of fifty-third wall, at bottom.
265 to 267	R 37.20	14.6	[Measured from Sta. 266.] Center of fifty-third opening.
268	R 44.40	9.7	Top of fifty-fourth wall.
269	R 61.00	19.3	On fifty-fourth wall.
270	R 106.10	67.2	On fifty-fourth wall; incurve.
271	R 113.10	32.9	On fifty-fourth wall; incurve.
272	R 113.12	45.6	On fifty-fourth wall; incurve.
273	R 110.40	26.1	On fifty-fourth wall; incurve.
274	R 104.20	27	On fifty-fourth wall; incurve.
274 to 275	R 34.00	35.5	On fifty-fourth wall; outcurve.
276	R 69.45	38.2	On fifty-fourth wall; outcurve.
277	R 81.45	45.3	End of fifty-fourth wall; incurve.
278	R 82.30	18.9	Center of fifty-fourth opening.

Stations.	Bearing.	Dist.	
279	R 83.00	14.2	Top of fifty-fifth wall.
280	R 83.35	50.4	On fifty-fifth wall; incurve.
281	R 77.55	47.6	On fifty-fifth wall; incurve.
282	R 69.50	44.7	On fifty-fifth wall; incurve.
282 to 283	R 6.10	117.7	End of fifty-fifth wall.
284	R 10.45	17	Center of fifty-fifth opening.
285	R 20.30	30	Top of fifty-sixth wall. This is what is usually given as a "mound," at the west of the entrance to "old fort"
286	R 34.30	48.8	End of wall fifty-six, on top, next to road at entrance.
286 to 287	R 102.45	28*	Center of fifty-sixth opening, the entrance to old fort.
288	R 63.30	20.8	Bottom of fifty-sixth wall.
102	R 98.30	54.2*	[Measured from Sta. 286.] On twenty-third wall.
289	R 8.45	65.6	[Measured from Sta. 288.] Top of ravine between fifty-sixth wall, the last of the old fort, and fifty-seventh wall, the first (on the west) of the new fort (going from the south). There is no indication of artificial work between fifty-sixth wall and the ravine. [Measured from Sta. 286, it is 34.9 feet to bottom of wall; thence, in same line, 44.2 feet to Sta. 289.]
290	R 8.45	99.4	Beginning of fifty-seventh wall, on opposite side of ravine. The wall has caved back to some extent from the washing out of the ravine.
291	R 12.25	40	On fifty-seventh wall.
290 to 99	R 122.00	123*	Across isthmus, to last wall of new fort, on the east.
291 to 292	R 31.45	78.4	On fifty-seventh wall.
293	R 26.00	57.6	On fifty-seventh wall; slight incurve.
294	R 20.10	34.6	On fifty-seventh wall; incurve.
295	R 11.45	26.6	On fifty-seventh wall; sharp incurve.
296	R 3.15	26.2	On fifty-seventh wall; slight outcurve.
297	L 8.05	37.1	On fifty-seventh wall; slight outcurve.
298	L 19.15	50	On fifty-seventh wall; incurve.
298 to 299	L 55.30	24	Highest point on fifty-seventh wall, overlooking valley; very sharp turn in wall.
300	L 31.45	14.7	End of fifty-seventh wall.
301	L 3.00	20.7	Center of fifty-seventh opening.
302	R 14.10	17.9	Top of fifty-eighth wall.
303	R 38.15	56.5	On fifty-eighth wall.
304	R 46.00	56.9	On fifty-eighth wall; incurve.
305	R 46.15	63.9	On fifty-eighth wall; incurve.
306	R 47.15	159.8	On fifty-eighth wall.
307	R 46.45	31.6	On fifty-eighth wall, at middle of a depression where wall has been built across head of a ravine, which has filled in level above.

* Check measure, not to be added in.

Stations.	Bearing.		Dist.	
308	R	46.10	71.7	End of fifty-eighth wall.
309	R	47.29	25.1	Center of fifty-eighth opening.
310	R	47.45	16.8	Top of fifty-ninth wall.
311	R	48.10	48.7	On fifty-ninth wall; incurve.
311 to 312	R	26.25	91.7	On fifty-ninth wall; incurve.
313	R	33.15	57.6	On fifty ninth wall; incurve.
314	R	35.25	36.8	On fifty-ninth wall; incurve, and middle of depression.
315	R	32.00	54.4	End of fifty-ninth wall, incurve.
316	R	31 00	15.1	Center of fifty-ninth opening.
317	R	30.50	21.9	Top of sixtieth wall; outcurve.
318	R	33.45	42.7	On sixtieth wall.
319	R	36.30	104.2	On sixtieth wall.
320	R	36.00	49.5	On sixtieth wall; incurve above ravine.
320 to 321	L	5.00	50	End of sixtieth wall, at bottom of ravine; sharp incurve.
322	L	15.15	43	Top of sixty-first wall, above ravine.
323	L	18.45	50 5	End of sixty-first wall.
324	L	18.45	12	Center of sixty-first opening.
325	L	18.20	17.3	Top of sixty-second wall.
326	L	14.15	44.8	On sixty-second wall· outcurve.
327	L	12.00	59	End of sixty-second wall.
328	L	9.45	16.7	Center of sixty-second opening.
329	L	7.45	16	Top of sixty-third wall.
330	L	5.10	20.4	End of sixty-third wall, at top of ravine.
330 to 331	R	12.45	50	End of sixty-third wall, on slope of ravine. Wall seems to have been built across the ravine, and been washed out, the wall on opposite side deflecting the water against this wall. The slope is very steep on both sides.
332	R	3.00	34	Bottom of ravine; beginning of sixty-fourth wall.
333		0	74	Top of sixty-fourth wall, at top of ravine.
334	L	7.50	24.2	On sixty-fourth wall; sharp incurve.
335	L	24.15	47.5	On sixty-fourth wall.
336	L	40.00	59.8	End of sixty-fourth wall; outcurve.
337	L	41.10	16.2	Center of sixty-fourth opening.
338	L	40.15	16.4	Top of sixty-fifth wall.
338 to 339		0	81.4	End of sixty-fifth wall, at bottom of ravine.
340	L	21.15	43.8	Top of sixty-sixth wall, top of ravine; incurve.
341	L	35.00	40	End of sixty-sixth wall; incurve.
342	L	35.10	10.4	Center of sixty-sixth opening.
342x	L	51.45	37.9	Bottom of sixty-sixth and sixty-seventh walls, which run out nearly parallel at their ends, with a slight depression as an opening, and unite in a rounded wall at the bottom.
343	L	34.05	15 2	[Measured from Sta. 342.] Top of sixty-seventh wall.

Stations.	Bearing.	Dist.	
344	L 12.35	71.9	End of sixty-seventh wall.
345	L 8.35	20	Center of sixty-seventh opening.
346	L 6.00	24	Top of sixth-eighth wall.
347	L 6.20	51.5	On sixty-eighth wall; slight outcurve.
347 to 348	R 27.30	62.5	End of sixty-eighth wall.
349	R 29.50	19	Center of sixty-eighth opening.
350	R 31.30	31.2	Top of sixty-ninth wall.
350 to 351	R 46.15	62.8	End of sixty-ninth wall, at top of deep ravine.
351 to 352	R 22.40	53	End of sixty-ninth wall, on slope of deep ravine.
353	R 13.45	90	Beginning of seventieth wall, on slope of deep ravine.
353 to 354	R 35.35	44.8	On seventieth wall, on slope of deep ravine; incurve.
355	R 8.30	64	On seventieth wall, at top of deep ravine; sharp incurve, making almost a right angle.
355 to 356	L 71.45	107.6	On seventieth wall; slight outcurve.
357	L 78.15	115	End of seventieth wall; slight outcurve; edge of ravine.
358	L 69.25	56.8	Top of seventy-first wall, on edge of washout.
359	L 53.00	74	End of seventy-first wall.
360	L 49.05	19	Center of seventy-first opening.
361	L 44.10	23.5	Top of seventy-second wall.
362	L 35.50	49.5	On seventy-second wall.
363	L 26.25	85.6	End of seventy-second wall, above pike.
364	L 21.20	51 8	Top of seventy-third wall, above pike, on north side.
365	L 21.30	35.7	On seventy-third wall; sharp outcurve.
365 to 366	R 20.35	41.7	End of seventy-third wall; sharp outcurve.
367	R 29.45	27.5	Center of seventy-third opening; sharp outcurve.
368	R 41.45	22	Top of seventy-fourth wall; sharp outcurve.
368 to *	R 3.45	113.5*	Back sight to a point at the bottom of inside slope of seventy-third wall, where pike has cut off the end.
369	R 114.35	53.4	On seventy fourth wall.
370	R 113.00	68.2	On seventy-fourth wall.
371	R 115.30	56 7	End of seventy-fourth wall; incurve.
371 to 372	R 78.25	41	Middle of seventy-fourth opening [ravine].
373	R 67.40	43	Top of seventy-fifth wall.
374	R 68.30	8.9	Center of seventy-fifth opening.
375	R 72.15	21.7	Top of seventy-sixth wall.
376	R 76.25	83.9	On seventy-sixth wall.
376 to 377	R 88.15	28.2	End of seventy-sixth wall, top of ravine.
378	R 90.15	37	End of seventy-sixth wall, slope of ravine.
379	R 86.45	31	Top of seventy-seventh wall, slope of ravine.

* Check measure, not to be added in.

Stations.	Bearing.	Dist.	
380	R 84.50	43.8	Top of seventy-seventh wall, top of ravine; outcurve.
380 to 381	R 79.45	206	End of seventy-seventh wall.
381 to 382	R 80.05	18	Center of seventy-seventh opening.
383	R 75.35	23.8	Top of seventy-eighth wall.
384	R 80.15	132.2	On seventy-eighth wall.
384 to 385	R 85.50	70.3	End of seventy-eighth wall; outcurve.
386	R 87.15	15.4	Center of seventy-eighth opening.
387	R 84.05	22	Top of seventy-ninth wall.
388	R 81.30	61	On seventy-ninth wall; slight outcurve.
389	R 81.30	160.5	End of seventy-ninth wall; outcurve.
389 to 390	R 90.15	18.4	Center of seventy-ninth opening.
391	R 93.05	21.4	Top of eightieth wall.
392	R 98.45	61.2	On eightieth wall.
393	R 99.00	142	End of eightieth wall.
394	R 99.05	22.6	Center of eightieth opening.
395	R 99.00	37.8	Top of eighty-first wall.
395 to 396	R 98.00	80.8	End of eighty-first wall.
396 to 397	R 93 35	28	Center of eighty-first opening.
398	R 94.15	28	Top of eighty-second wall.
398 to 399	R 87.55	47.8	On eighty-second wall; outcurve.
399 to 400	R 98.00	25.8	On eighty-second wall, sharp outcurve.
401	R 117.15	30.8	End of eighty-second wall; sharp outcurve.
402	R 130.15	29.9	Center of eighty-second opening.
402 to 403	L 18.05	31	Top of eighty-third wall.
403 to 404	L 15.45	75.7	End of eighty-third wall.
405	L 15.45	27.8	Center of eighty-third opening.
406	L 14.05	28.4	Top of eighty-fourth wall.
406 to 407	L 9.15	93	End of eighty-fourth wall, at pike.
0	L 8.00	65	Point of beginning.

The total length of wall, on top, 18,712.2 feet; equal, in miles, approximately, to 3; $3\frac{1}{2}$; $3\frac{6}{11}$; $3\frac{31}{57}$; $3\frac{99}{182}$; $3\frac{130}{239}$; or precisely $3\frac{359}{660}$.

NOTE.—In stating the number of openings in the fortification, we include the natural washes and breaks.

Of the 84 openings, 9 are natural washouts, and 74 are designed entrances (gateways), or for purposes of defense.

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